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Management of safety climate and the psychosocial work environment – New challenges for occupational health and safety professionals?

Thesis presented by

Sara Leitão Alexandre

(MSc Occupational Health, BSc Environmental Health)

Under the supervision of

Dr. Birgit. A. Greiner

For the degree of Doctor of Philosophy



Department of Epidemiology and Public Health

Head of Department

Prof. Ivan Perry

July 2015

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Declaration

I declare that this thesis has not been submitted as an exercise for a degree at this or any other University. The work, upon which this thesis is based, was carried out in collaboration with a team of researchers and supervisors who are duly acknowledged in this thesis. The Library may lend or copy this thesis upon request.

Signed:

Date:

(Sara Leitão Alexandre)

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Glossary

CSO – Central Statistics Office

EAP – Employee Assistance Program

ESENER – European Survey of Enterprises on New and Emerging Risks

EU-OSHA – European Agency for Safety and Health at Work

LFS – Labour Force Survey

HC – Health Climate

HP – Health Promotion

HSA – Health and Safety Authority

HSE – Health and Safety Executive

HSP – Health and Safety Practitioner

IOSH – Institution of Occupational Health and Safety

INSHPO – International Network of Safety & Health Practitioner Organisations)

ILO – International Labour Organisation

JDCS – Job Demand-Control-Support

OHS – Occupational Health and Safety

PRIMA-EF – European Framework for Psychosocial Risk Management

PPE – Personal Protective Equipment

RIDDOR – Reporting of Injuries, Diseases and Dangerous Occurrences

SC – Safety Climate

THOR – The Health and Occupation Research

UK – United Kingdom

WHO – World Health Organisation

Preamble

A key recommendation of my MSc Thesis, entitled “Risks and Hazards affecting Health and Safety Advisors” (Leitao, 2009) was the need for further investigation into these factors due to the dearth of detailed information regarding this area. From my experience during the MSc, and from the shared opinions and views of my peers (in the course and in practice, in Ireland and abroad), it was clear that serious issues were affecting the Health and Safety Practitioner (HSP) as a professional class and these were also having an impact on occupational health and safety (OHS) and the manner how it is being practiced and/or managed in organisations. It became a passion of mine to explore this area further.

Interestingly, these professionals themselves had not thought of this as an issue to be addressed or studied and, thus, a solution or a possible improvement had not been sought. Hence, from the outset of this thesis, my main premise was “If Health and Safety practitioners are the ones looking after people’s wellbeing at their workplace, then who looks after them?”. This presented an opportunity to change perspective and look at these professionals as workers with rights and necessities who were also exposed to their own occupational hazards and risk factors.

Hence, the drive and inspiration to explore this issue was present from the early stages of (or even before) this doctoral research. When the Department of Epidemiology and Public Health offered the chance to fund a PhD in the area of

Occupational Health, the opportunity was seized with both hands and taken without second thought.

In the first few years of my doctoral experience, I also had the opportunity to coordinate the campus-based taught MSc in Occupational Health. I lectured in this and other courses offered by the Department of Epi. & Public Health while also developing an online version of the MSc in Occupational Health. During this time, I also completed the Scientific Training for Enhanced Postgraduate Studies (STEPS) course among other relevant postgraduate training.

Among the many benefits of these multilateral experiences and multitude of contacts, it brought me in close contact with practitioners in OHS and related areas as well as scholars in this field. All these contacts were invaluable for the development of this research. From sharing of experience and knowledge on the job and the area, to providing important input in this specific study, the networking promoted by this experience has been essential for this research. As the project developed and took a clearer shape, it became clear to me that for a deeper understanding of the HSPs situation in Ireland, it would be essential to experience and observe it first-hand. Hence, I decided to arrange a work-placement which was made possible through the previously mentioned networking with other HSPs. This work experience in a pharmaceutical manufacturing company allowed me to develop a tailored safety climate assessment and programme for the organisation, while also allowing me to explore the topic of safety climate in further depth. This placement and the data obtained through it led to paper 2 in this thesis.

The networking and relationships developed with HSPs, as well as IOSH members and committees, made the data collection possible at national level in both Ireland and the UK. This may otherwise, have not been possible and, therefore, would have greatly jeopardised the research presented here. Developing and managing this project was a highly enriching experience and the collaboration with IOSH and its affiliates was invaluable.

This thesis reflects the result of a number of years' work and dedication looking into OHS and its current practice in organisations, connecting with professionals and practitioners and working together towards a growing and deeper knowledge in this area. This has been a hugely enriching path of research, professional and personal growth. Although I feel that much more is still to be done and studied on the topic of HSPs and SC and their role in OHS of organisations, I feel (and hope) that a significant contribution has been made to this area by investigating this under-explored field.

Thesis Abstract:

Introduction: The work environment and Occupational Health and Safety (OHS) practice have changed over the last number of years. A holistic OHS approach has been recommended by the authorities in this field (e.g. World Health Organisation (WHO), European Agency for Safety and Health at Work (EU-OSHA) and the International Labour Organisation (ILO)). This involves a unified action engaging elements of the physical and psychosocial workplace with greater focus on prevention and promotion of health and wellbeing. The health and safety practitioner (HSP) has been recognised as one of the main agents for implementation of OHS. Within an organisation they act as a leader of change and a professional who shapes health and safety while safeguarding the wellbeing of individuals at work. Additionally, safety climate (SC) has been developed as an essential concept for OHS of an organisation, its productivity and the wellbeing of its workforce. Scholars and practitioners have recognised the great need for further empirical evidence on the HSP's role in a changing work environment that increasingly requires the use of preventative measures and the assessment and management of psychosocial work-related risks. This doctoral research brings together the different concepts used in OHS and Public Health including SC, Psychosocial workplace risks, Health Promotion and OHS performance. The associations between these concepts are analysed bearing in mind the WHO Healthy Workplace Framework and three of its main components (physical and psychosocial work environment and health resources). This thesis aims to establish a deeper understanding of the practice

and management of OHS in Ireland and the UK, exploring the role of HSPs (employed in diverse sectors of activity) and of SC in the OHS of organisations.

Methods: One systematic review and three cross-sectional research studies were performed. The systematic review focussed on the evidence compiled for the association of SC with accidents and injuries at work, clarifying this concept's definition and its most relevant dimensions. The second article (chapter 3) explored the association of SC with accidents and injuries in a sample of workers (n=367) from a pharmaceutical industry and compared permanent with non-permanent workers. Associations of safety climate with employment status and with self-reported occupational accidents/injuries were studied through logistic regression modelling. The third and fourth papers in this thesis investigated the main tasks performed by HSPs, their perceptions of SC, health climate (HC), psychosocial risk factors and health outcomes as well as work efficacy. Validated questionnaires were applied to a sample of HSPs in Ireland and UK, members of the Institute of Occupational Safety and Health (n=1444). Chi-square analysis and logistic regression were used to assess the association between HSPs work characteristics and their involvement in the management of Psychosocial Risk Factors, Safety Culture and Health Promotion (paper 3). Multiple linear regression analysis was used to determine the association between SC, HC, psychosocial risk factors and health outcomes (general health and mental wellbeing) and self-efficacy.

Results: As shown in the systematic review, scientific evidence is unable to establish the widely assumed causal link between SC and accidents and injuries. Nevertheless, the current results suggested that, particularly, the organisational

dimensions of SC were associated with accidents and injuries and that SC is linked to health, wellbeing and safety performance in the organisation. According to the present research, contingent workers had lower SC perceptions but showed a lower accident/injury rate than their permanent colleagues. The associations of safety climate with accidents/injuries had opposite directions for the two types of workers as for permanent employees it showed an inverse relationship while for temporary workers, although not significant, a positive association was found. This thesis' findings showed that HSPs are, to a very small degree, included in activities related to psychosocial risk management and assessment, to a moderate degree, involved in HP activities and, to a large degree, engaged in the management of safety culture in organisations. In the final research study, SC and HC were linked to job demands-control-support (JDCS), health, wellbeing and efficacy. JDCS were also associated with all three outcomes under study. Results also showed the contribution of psychosocial risk factors to the association of SC and HC with all the studied outcomes. These associations had rarely been recorded previously.

Discussion & Conclusions: Health and safety climate showed a significant association with health, wellbeing and efficacy - a relationship which affects working conditions and the health and wellbeing of the workforce. This demonstrates the link of both SC and HC with the OHS and the general strength or viability of organisations. A division was noticed between the area of “health” and “safety” in the workplace and in the approach to the physical and psychosocial work environment. These findings highlighted the current challenge in ensuring a holistic and multidisciplinary approach for prevention

of hazards and for an integrated OHS management. HSPs have shown to be a pivotal agent in the shaping and development of OHS in organisations. However, as observed in this thesis, the role of these professionals is still far from the recommended involvement in the management of psychosocial risk factors and could have a more complete engagement in other areas of OHS such as health promotion. Additionally, a strong culture of health and safety with supportive management and buy-in from all stakeholders is essential to achieve the ideal unified and prevention-focussed approach to OHS as recommended by the WHO, EU-OSHA and ILO.

Chapter 1 - Introduction and Background

1. Occupational health and safety and population health

While Occupational Health and Safety (OHS) deals primarily with the workplace, ideally it should also operate hand in hand with the broader Public Health agenda. In past decades these two areas of health have drifted apart and became progressively disconnected. However, in recent years, a greater awareness has been raised on this partition leading to efforts to narrow the gap between these two areas of health through improved knowledge of the impact and essential influence one has on the other (Quinn, 2003; Papadopoulos *et al.*, 2010). Commonly understood as “the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations”, according to the WHO and the International Labour Organization (ILO) (2012), OHS has developed and expanded greatly over time taking a progressively significant role in the health of, not only, the employed individuals, but also the general population.

Considering that 64% of 15-64 year-old individuals in the Eurozone-28 are in employment (Eurostat, 2014), OHS offers a vital opportunity to reach a large population and address possible health and wellbeing issues affecting individuals in a particular environment. This also offers an avenue to introduce OHS practices to individuals which they may apply not only in the workplace but also in daily lives. However, the possibilities offered by the partnership between public health and OHS are not restricted to this.

The demands in the area of OHS have been progressively growing. The constant and intense changes in society have been reflected in the workplace.

Technological advances, economic instability, labour market restructuring and socio-demographic changes in the workforce are among the new factors which pose additional challenges and demands to OHS (Kompier, 2006; Koukoulaki, 2010; Papadopoulos *et al.*, 2010; Eurofound and EU-OSHA, 2014).

Individuals' experiences at work, whether they are physical, emotional, mental, or social affect them while they are in the workplace (Danna and Griffin, 1999). It is also known that these experiences “spill over” into non-work domains. Workers spend about one-third of their waking hours at work, and do not necessarily leave the job behind when they leave the workplace (Conrad, 1988). Hence, the current conception of OHS takes into consideration the impact of work on health and safety at work and other areas of life (and vice-versa), not restricting its scope to workers in large organisations or the employed population only, as it also addresses the effects of unemployment on the general wellbeing of individuals and communities (Diaz-Cabrera *et al.*, 2010).

Research has shown that work has a major impact on the health of the population. Recently, a study by Driscoll *et al.* (2014) has found that the overall worldwide population attributable fraction for work-related low back pain, alone, was 26%. Furthermore, Takala *et al.* (2014) estimated that globally there were 2.3 million deaths annually for reasons attributed to work. The biggest fraction related to work-related diseases, with 2.0 million deaths, and 0.3 million linked to occupational injuries. These authors also found that, in 2012, economic costs of work-related injury and illness varied between 1.8% and 6.0% of GDP in country estimates, the average being 4% according to ILO data.

Studies with a focus on the specific occupational risk factors of workplace carcinogens, airborne particulates, hazards from equipment, ergonomic stressors for back pain and noise, showed that these hazards were responsible for the loss of 24 million disability-adjusted life years (DALY) due to deaths at work in the year 2000 (Fingerhut *et al.*, 2005). Furthermore, Fingerhut *et al.* (2005) evidenced that, globally, 37% of all back pain (an estimated 0.8 million DALY), and 16% of hearing loss (4.2 million DALY) were attributable to work. Although not causing premature death, these health problems lead to substantial disability which, beyond the personal and social impacts, results in significant loss of time from work and high economic loss.

The European Commission (2013) has recently highlighted that “work-related morbidity and mortality not only result in suffering and hardship for workers and their families, but also add to the overall cost to society through lost productivity and increased use of medical and welfare services”. Recent data shows that at European level, 44 million people were affected by occupational musculoskeletal disorders (MSDs) in 2013 and these were responsible for 50% of all work-related health problems and a total of 39% of all sickness absence. Additionally, 19% of all recorded sickness absence was due to work-related stress, an issue experienced by 22% of working Europeans (Robertson, 2014).

1.1. The Health and Safety Practitioner in Occupational Health and Safety

Although it is recognized that the success of OHS practice needs the involvement and participation of many parties and stakeholders within society

and organisations at organisational level, Health and Safety Practitioners (HSPs) hold a pivotal role in ensuring compliance with the relevant legal requirements and making sure that the best working conditions are guaranteed for employees (Eckhardt, 1993; Brun and Loiselle, 2002; Hale *et al.*, 2005). As frontline professionals advocating for the health and safety conditions at work, HSPs play a crucial part in the wellbeing of employees. This thesis will address the role of these practitioners within a changing societal and work environment and exploring their most significant challenges and current working conditions.

The HSPs perform duties that include the development and implementation of procedures and safe systems of work, carrying out or supervising risk assessments and health surveillance programmes, the development and delivery of training, accident investigations and audits. This job requires, therefore, building up and maintaining a level of vigilance within the organisation so as to anticipate the different types of threats to worker health and promoting health and wellbeing in the workplace.

In a situation where the priority is placed on the economic or financial aspects of the organisation and its activity, the challenge of conciliating productivity with best OHS practice becomes greater. This scenario has been exacerbated in the past decades and has become one of the greatest challenges faced in OHS in the past years.

In summary, from a population health perspective, the HSP is an important agent for safe guarding the health and safety of the working population in an

ever changing work environment. The relevance of this task warrants further investigation into the role of HSPs, which constitute a focus of this thesis.

2. Occupational Health and Safety Statistics in Europe, Ireland and the United Kingdom

In this section, an overview of the health and safety statistics for Europe will be provided to describe the magnitude of the OHS issue in this area. Particular focus will then be placed on the two countries involved in this study, namely Ireland and UK, addressing statistics from mandatory surveillance systems in relation to accidents and injuries, registries for occupational and work-related illness, as well as worker and employer surveys. The general prevalence, incidence and trends over time for these countries will be presented, also showing the current position of Ireland and the UK within the European scenario.

2.1. The European Risk Observatory

The European risk observatory was established to monitor health and safety conditions and work-related health in all EU member-states, using a harmonised reporting system. In addition to the official reporting systems (Eurostat), various surveys and studies (e.g. Pan-European Poll, Working Conditions Survey, European Survey of Enterprises on New and Emerging Risks (ESENER), amongst others) have been carried out in recent years in an attempt to create a realistic picture of the work situation for each of the state members.

The information gathered by reporting systems and surveys has proved to be quite relevant, evidencing not only discrepancies between some of the European countries in what concerns OHS, but also demonstrating the need for improvement and action in specific areas in a few nations.

These independent European studies developed by institutions, such as Eurofond, ILO and EU-OSHA, are a valuable source of data which, when added to the official reported values (through national statistics supplied to Eurostat), provide a comprehensive overview of the European situation. Nevertheless the issue of underreporting has been acknowledged as an important concern to address to adequately tackle work-related health and safety issues (Drummond, 2007; Spreeuwers *et al.*, 2010). Scholars have observed that the “loose” definition of occupational disease and work-related illness as well as the lack of clarity on who is, or should be, responsible for reporting these issues lead an inadequate reporting of these conditions. Furthermore, the different systems available across the members-states and even within each country generate some confusion regarding which system to use and which is the most efficient to adopt. Authors have also noticed that lack of awareness also plays a big part in this issue, highlighting the need to improve the education and participation of notifying agents (physicians, employers and others) (Drummond, 2007; Spreeuwers *et al.*, 2010).

When looking at the occurrence of accidents at work, Eurostat (European Commission, 2015) showed that approximately 7 million workers in the EU (3.2%) were involved in an accident over this study’s 12-month period in 2012. From this group, 22% of the individuals had to avail of sick leave for one month

or more due to a work accident. Accidents at work were most common in sectors such as Construction, with the highest accident rates, followed by Manufacturing and Agriculture.

The latest Eurostat data on the main causes of occupational illness (European Commission, 2015) showed that, for 2007, although Musculoskeletal Disorders (MSDs) were most reported conditions linked to health related problems (54.2%), Stress, anxiety and depression were the factors with the second greatest impact on individuals' health (19.9%). Additionally, according to the most recent data available from Eurostat, 40.1% of workers were exposed to factors affecting physical health and total of 26% were found to be exposed to factors affecting the mental well-being. This information shows how psychosocial aspects have gained a higher relevance in relation to health and wellbeing at work.

Additional figures from Eurostat, in particular from the Labour Force Survey (LFS) – the yearly household surveys performed in each EU country - showed that 50% of workers felt limitations in their normal daily activities “to some extent” due to work related ill-health issues, with an additional 22% stating they felt this “considerably” (European Commission, 2015). This research provided further data contributing to a clearer picture of the situation in the group of member states. According to this, in 2010 there were 20 million people (8.6%) with ill-health related to work and 27% of them (6.9 million workers) lead to sick leave for a period of more than 1 month (European Commission, 2015).

The pan-European poll – developed by EU-OSHA in 2009 and which surveyed households in the EU27 – evidenced the general concern present in the European workers. Data from this representative survey (EU-OSHA, 2009b) showed that approximately 47% of the individuals believed their ill-health was “to some extent” caused by their occupation. Furthermore, 28% workers stated that their job has contributed “a great deal” to their current health (EU-OSHA, 2009b).

The fifth European Working Condition Observatory (EWCO, 2010) - an EU funded study which interviewed representative samples of workers in each country - further substantiates the aforementioned figures as approximately 25% of the respondents stated that their health was affected negatively by their job.

All of the aforementioned figures reflect the large magnitude of work-related health and safety issues of the Europeans.

When, in 2010, the 5th European working conditions survey asked workers if they thought OHS in their countries had improved or worsened, 55% of the European participants stated they felt it had become better or much better. Only a minority of 32% affirmed it had gotten worse or much worse, providing encouraging evidence of the positive progress in OHS in Europe.

Although the general numbers on OHS in the European scenario are still quite concerning, and though the challenges and difficulties facing health and wellbeing at work have been changing, an improvement has been noticed in the past years. The general perception from workers on their OHS seems to be

progressively more positive which can be the result of the implementation of policies and practices at organisational level and of interventions at national and governmental level as well.

Nevertheless, it is known that a high proportion of the population is still affected by work-related health conditions in Europe and this is still a significant concern among individuals. Although musculoskeletal disorders are the main cause of problems, stress, depression and issues related to psychosocial wellbeing have a high prevalence in Europe. These are also among the main source of work-related conditions and have been recognised as a priority to address in the current management of OHS.

2.2. The Irish Situation

In 2013, the Irish Health and Safety Authority (HSA) reported 6,598 non-fatal injuries, maintaining its trend of reduction of these numbers since 2010. However, taking into consideration the data from the Irish Central Statistics Office (CSO) an increase in rate of those employed who suffered such injuries was recorded, from 9.1 to 9.6 per 1,000 workers between 2011 and 2012 (Health and Safety Authority, 2014b).

When looking at the fatality rate, a decrease was noticed with a rate of 2.6 per 100,000 workers for 2011, 2.3 for 2012 and 2.1 for 2013 (corresponding to 40 deaths in the latter). Notwithstanding this, Ireland held the fifth highest worker fatality rate in the EU15 in 2013 (Health and Safety Authority, 2014).

In what concerns ill-health due to work (requiring four or more days absence), a rate of 14.8 cases per 1000 individuals was recorded in Ireland in 2012. This was the fourth year in which an increase was noticed. In total, these rates of occupational illness and accidents led to 85,210 working days lost representing a rate of 46 days lost per 1000 individuals (Health and Safety Authority, 2014b).

In 2005, Ireland entered “The Health and Occupation Research” (THOR) network, a surveillance scheme based on voluntary reporting from GPs, medical specialists and occupational health physicians in the UK and Ireland. Recent reports have shown that 51% (522 cases) of the conditions reported by occupational physicians related to mental health issues and 35% (365 cases) concerned musculoskeletal disorders. Skin related conditions represented only 9% (90 cases) of the health issues reported by these physicians although a total of 365 skin-related conditions were reported by dermatologists specifically. Similarly, although occupational physicians only reported 17 cases of respiratory-related disorders, pulmonary specialists recorded 103 cases of conditions of this type (Money *et al.*, 2015).

The general OHS scenario in Ireland has shown that the impact of work on the wellbeing of these citizens is still a significant concern. The fact that the Pan-European Poll (EU-OSHA, 2009b) registered that workers in Ireland consider that ill-health was caused “to some extent” (40%) or a great deal (28%) by the individual’s job was a clear evidence of such worry.

2.3. The United Kingdom's Situation

In what concerns injury at work, or non-fatal accidents, the UK has two systems to gather data on this aspect: the RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences) – where employers report injuries sustained by their employees at the workplace; and the Labour Force Survey (LFS) where citizens are consulted independently. This showed to be an important system for data collection, revealing discrepancies in the numbers recorded.

According to RIDDOR, accidents must be reported where they caused a worker's absence for more than seven consecutive days as the result of their injury. A total of 77 593 injuries were reported under RIDDOR (304.6 per 100,000) for 2013/2014. However, according to LFS there were 148,000 cases which led to over-7-days absence (500 per 100,000), evidencing that only approximately 52% of the cases of occupational injury were actually reported adequately by employers.

Additionally, it is interesting to notice that a total of 629,000 injuries (2014 per 100,000) have occurred in the UK for the 2013/2014 period. These include minor injuries and further accidents which may have resulted in a worker being incapacitated for more than three consecutive days - events which must be recorded, but not reported to the authorities (Health and Safety Executive, 2013).

Data for 2013/14 shows a fatality rate of 0.44 per 100,000 for this country (which equates to 133 fatalities for the year). Although this represents a significant reduction in the number of fatal accidents per year, the decline in the

fatality rate has been quite modest, remaining close to the 0.6 per 100,000 in 2011/12 and 0.5 for 2012/13. Still, the UK holds the second lowest standardised work-related fatality rate in the EU-15 (0.74 per 100,000 workers).

As no data was collected by the Health and Safety Executive (HSE) on work-related ill-health in the UK for the years 2012/13, the most recent figures are supplied by their LFS. According to this, there were 535,000 new cases of ill-health among those working in 2013. In 2013/14 an estimated 2.0 million people were suffering from an illness (long standing as well as new cases) which they believed was caused or made worse by their current or past work. New cases of ill-health have generally fallen since 2001/02, reaching a lower value of 452,000 in 2011/12. Although no ill-health data was collected in 2012/13, the current figures for 2013/14 show that the number of new cases increased to 535,000, a similar level to that of 2009/10 (Health and Safety Executive, 2013). According to the HSE-UK (2013), 28.2 million days were lost due to work-related ill-health or injury (16 days per case) - 23.5 million days lost due to work-related ill-health and 4.7 million due to workplace injury.

Similar to the Irish situation, the highest proportion of health conditions reported to THOR by occupational health physicians were related to mental health: 56% of British cases and 61% of the cases in Northern Ireland (NI) (a total of 4,148 cases for both regions). These conditions were followed by musculoskeletal disorders (making 31% of the cases in Great Britain (GB) and in NI; a total of 2,022 cases). Although the proportion of skin and respiratory conditions reported by occupational physicians was quite low, there were

higher numbers recorded by dermatologists (75 cases in NI and 5,046 in GB) for work-related skin conditions. As expected, pulmonary specialists also reported higher numbers of respiratory work-related diseases when compared to occupational physicians with 75 cases recorded in NI and 5,262 in GB (Money *et al.*, 2015).

OHS in the United Kingdom has a long history of established systems for prevention and protection of health and wellbeing at work - with its roots in 1802 (*Timeline - History of Occupational Safety and Health*, 2014). This might contribute to a positive safety culture and mentality among both employers and employees. However, the Pan-European poll in this country revealed that OHS is still a concern to its workers as 21% believed that work contributed “a great deal” to individuals’ ill-health and 49% agreed that ill-health was “to some extent” caused by a person’s occupation (EU-OSHA, 2009b).

2.4. The countries in the study

Interesting similarities and distinctions can be found between Ireland and the UK; countries to be studied in this piece of work. The UK has one of the lowest accident and fatalities at work rates in Europe, whereas Ireland, although also showing a low record for these rates in the past, seems to have suffered an increase in these rates in more recent years with figures decreasing again in 2012 (figure 1.1).

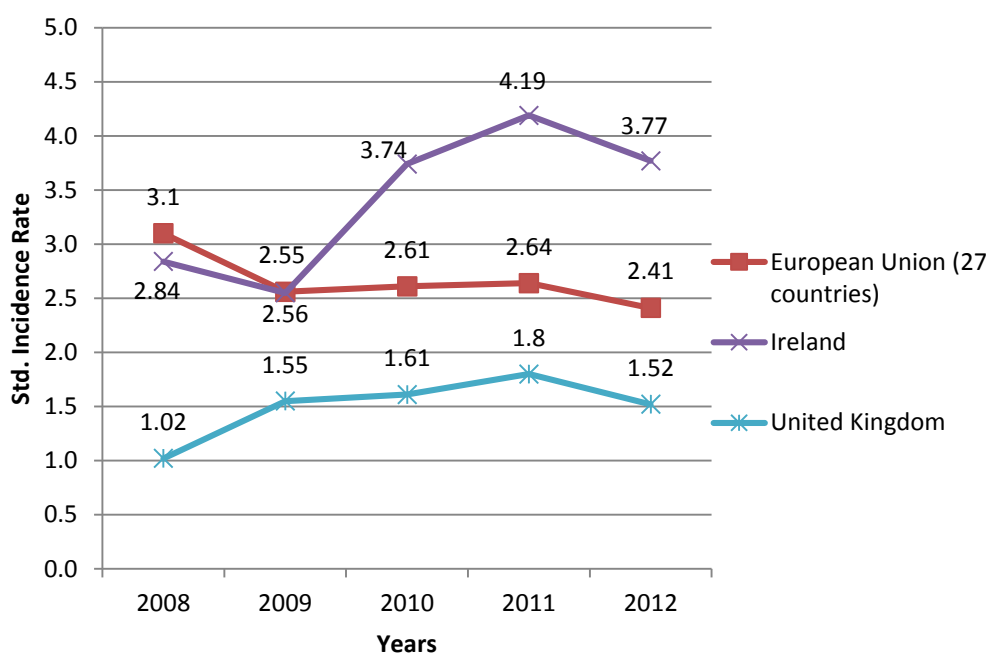


Figure 1.1 - Standardised incidence rate of accidents at work (requiring more than 3 days of absence) in UK, Ireland and EU-27 (European Commission, 2015)

Similarly, these countries' work-related health indicators seem to show a different progress over the years as the UK values remained stable overall, whereas a significant increase was noticed for Ireland (table 1.1).

Table 1.1 – Percentage of people reporting work-related health problems in Ireland, UK and EU-27 - years 2007 & 2013 (adapted from Eurostat - European Commission, 2015)

	European Union (27 countries)		Ireland		United Kingdom	
	2007	2013	2007	2013	2007	2013
Work-related health problem resulting in limitations of daily activities (%)	43.4	:	36.5	53.0	32.1	40.9
Work-related health problem resulting in sick leave (%)	35.0	:	43.3	65.4	52.1	53.2

Hence, these seem to be two countries with somewhat well-established OHS structures and which may hold similar standards and cultures of safety but show two different scenarios of OHS.

However, interestingly in the latest European Working Conditions Survey 2010 (EWC2010) (*5th European Working Conditions Survey - EWCS2010*, 2010) the vast majority of both the Irish and the UK employees stated to be (very) well informed on health and safety risks related to their job (97% and 95.2% respectively) (EWCS, *5th European Working Conditions Survey - EWCS2010*, 2010). In the same survey, Ireland was the country with one of the lowest percentage of people who believed their work was affecting their health (10.6%). The UK followed in second with a proportion of 14% of the population with the same opinion. This is an interesting example of the similarity of the attitude and positive belief towards OHS in the working population. When asked if their health or safety was at risk because of their work, these populations' answers became even more similar (UK 17.6%, IRL 16.9%). It was also interesting to notice that all these values were well below the European averages (for EU-27) of 25% individuals believing work was affecting their health and 24.2% stating that their health was at risk due to their job.

These values would indicate that, although the OHS situation is different in these countries, their workforce and employers might have a similar perception of the importance of work on health and of the relevance of OHS practice on the individuals' wellbeing.

2.5. Summary

From the data available on OHS performance in Europe and, particularly, Ireland and the UK, it is clear that fatal work-related accidents are still of great concern. The rates in these countries are still high and, worryingly, its decline has been slow and very modest. Similarly, the levels of accidents in the workplace leading to injury or absence from work due to ill health are also high and represent an additional source of concern.

The statutory reporting systems available in Europe provide valuable information and statistical data on the OHS performance and work-related health issues in Europe. Nevertheless, underreporting is still an issue which needs to be addressed as data has shown a significant level of underreporting of accidents, injuries or health problems in the state-members (including, as shown in the above sections, Ireland and the UK). As noticed by Spreeuwers *et al.* (2010) registries in EU countries do not adequately monitor existing occupational diseases or adequately alert to newly occurring occupational diseases.

The magnitude of occupational diseases and work-related illness is not as well-known considering the statistics available derive from voluntary reporting systems; the Irish data, in particular, has been recognised to be very limited. Diverse surveys have been carried out with representative samples of both employers and workers, providing a better insight into the growing magnitude and relevance of exposure to psychosocial work factors and stress-related health issues. However, this data holds limitations and restrictions associated to

its self-reported and voluntary nature. Strong and reliable reporting systems are, therefore, still required at national and European level, which provide an adequate and realistic picture of the OHS scenario in these countries, allowing to identify the challenges and priorities for an efficient management of arising issues.

3. The Health and Safety Practitioner

Health and Safety Practitioners (HSPs) are the frontline professionals responsible for ensuring adequate working conditions and promoting the health and wellbeing of individuals at work. They are known by a variety of titles from "Health and Safety Officer or Adviser" through to "Health and Safety Manager or Director", reflecting varying demands, levels of responsibility and relative position in the organisation (Jones, 2005; Guarnieri *et al.*, 2010).

The individuals working in occupational health and safety roles are responsible for providing a professional health and safety service to all levels of staff working for an organization (Brun and Loiselle, 2002). Thus, in general, these professionals ensure that organisations have safe and healthy working environments, checking that safety procedures are being followed, and enforcing safety and health requirements (NHS, 2006).

3.1. The role of the HSP

The core competences in the HSP job include a basic understanding of occupational health hazards and likely exposures, together with competence in generic risk assessment and controls hierarchy (Clark and Jones, 2003). Jones

(2005) also clarified that “at board-level, practitioners may be expected to advise on OHS strategy, policy formulation and implementation, and working with managers and team-leaders, to advise on measures to eliminate or minimise the risk of accidents and exposure to health hazards” (pg 10).

In 1989, the European Parliament recognized that Member States' legislative systems covering safety and health at the workplace differed widely and required improvement. It was also seen that self-regulatory standards could result in different levels of safety and health protection in different countries and could allow competition at the expense of safety and health. Thus the council Directive 89/391/EEC was created, encouraging the introduction of measures to improve OHS across the many member states. However, the role of the professional responsible for OHS seemed overlooked as this legal diploma did not specify the qualification requirements and competence requisites which these individuals should hold. This document states that the employer shall designate one or more workers to carry out activities related to the protection and prevention of occupational risks for the undertaking and/or establishment. If such protective and preventive measures cannot be organized for lack of competent personnel in the undertaking and/or establishment, the employer shall enlist competent external services or persons. However, there is no clear or agreed definition across the European countries on who should be considered a “competent” safety professional.

Research has attempted to gather information on HSPs in diverse countries to create a clearer profile of what this job is, what it ideally should represent and

to build an improved structure for this professional group (Hale *et al.*, 2005; Jones, 2005; Guarnieri *et al.*, 2010).

On a first approach to this, Dawson *et al.* (1984) identified these practitioners' main activities and provided a relevant insight into the resources and assets from which these practitioners could draw from, to perform their job and implement OHS actions. Kohn *et al.* (1991) recognised the need to ascertain, with further detail, the responsibilities of HSPs in the US. With their study, the authors determined that HSPs with different titles held diverse responsibilities, however, these generally related to regulatory compliance, record keeping, accident investigation and hazards management.

The European Network of Safety and Health Professional Organisations (ENSHPO) has given great focus to this issue and has developed research in the area of competences and qualifications of the HSPs in Europe (ENSHPO, 2013). As part of this body of research, Hale *et al.* (2005) described the main tasks and work characteristics of the HSPs in Europe, creating an extensive list of the numerous duties performed by these professionals. Looking into the European countries studied with more detail, the main activities in OHS are related to risk assessment and workplace inspections, ensuring compliance with the law and advice/information to workers and managers (Hale *et al.*, 2005). Although this job is mainly practical (with a technical branch) with numerous tasks involving interventions and activities on site, there is also a great (and very important) intellectual/empirical component to it. Many of the responsibilities of this professionals in the European setting involve keeping up to date with

legislation and best practice in the area, management of documentation (such as reports and records) and “informing and discussing with supervisors and managers” as mentioned above. All these activities demand research and investigation from the professional and an ability of self-education considering the different areas to be covered by HSPs.

It has been encouraging to note that the HSPs core duties include not only the more traditional legally required tasks, but also significant coverage of management systems, safety culture, safe behaviour issues and assessment of designs (Jones, 2005). However, in 2012, IOSH noticed a reduction in the organisational commitment towards OHS. HSPs participating in a survey performed by this institution highlighted the need to change organisational culture on health and safety issues and to integrate HS into everyday business operations (IOSH, 2012).

Hale *et al.* (2005) believed that there were various influences determining the tasks that safety professionals actually carry out, such as the specific characteristics of the industry (and the population involved in it). Furthermore, the authors added that “the direct employer determines the job description, or as contract principal determines the tasks that the safety consultant has been hired to carry out. The vision that employers have of the objectives of their own safety policy and the expertise that they need to realise it, will determine what the emphasis is” (Hale *et al.*, 2005, pg 3). Hale *et al.* (2005) highlighted that the science available in the country of activity and the setting in which the

individual is included also have an influence on the amount of issues and the manner in which they are dealt with in the OHS area.

Analysing this professional area, Brun and Loisel (2002) established specific professional profiles in which the HSP job was centred. According to these authors, the scope of the HSPs activities could be centred on two different levels: an operational level (if the HSP involved in activities such as risk inspection, correction of technical failures) or a strategic level (when the HSP is engaged in tasks linked to company policies, occupational health and safety management system, among others). Furthermore, these authors considered that the OHS practitioner's activity was mainly organised in three dimensions: human dimension (focused on the activities related to the way individuals fit in the organization, giving priority to the behavioural approach and training health and safety); technical dimension (encompassing the actions benefiting the technical aspects (machinery, equipment and materials) and related to other areas such as industrial hygiene, ergonomics and epidemiology); organisational dimension (concerning activities regarding the creation of rules, policies and programmes).

In recent years, Guarnieri *et al.* (2010) explored the roles and profiles of the HSPs in France, demonstrating the variety of titles and characteristics this profession can hold. With this survey of 803 HSPs this study provided additional data to clarify these professionals' job. The authors also identified that lack of information and employee awareness was the most significant obstacle faced by HSPs in the implementation of prevention policies, followed

by compliance with controls and risk analysis which was also one of the main difficulties in the job.

However, further empirical data and validation of these suggested models and role descriptions is still necessary. Currently there is no global or European job description for these professionals and an agreement on the structure and definition of this job is still to be reached.

Considering the wide range of responsibilities and the high demands of a role where the individual is responsible for workers' safety and wellbeing it becomes essential not only to have a clear understanding of the HSP job, but also to regulate this profession ensuring that the rights and duties of these professional are clearly defined.

3.2. The issue of HSP's role definition

Different organisations will have diverse demands and will require a great variety of responsibilities, depending upon the hazards found at specific operations. Therefore, it has been difficult to define the HSP responsibilities beyond the generic prevention of loss, control of injury or illness prevention traditionally used (Kohn *et al.*, 1991).

A range of literature has demonstrated that OHS is a multi-disciplined profession – the HSP role typically combines technical or scientific expertise, effective management techniques, and problem-solving and communication skills. As observed by Jones (2005), the challenges in OHS have changed in time since fifty years ago the main concerns in this area related to preventing

‘traditional’ industrial accidents. Currently, issues such as ergonomics, stress, occupational hygiene and management systems commonly form part of the working life of the Occupational HSP (Jones, 2005).

In 1978, the National Institute for Occupational Safety and Health (NIOSH) identified 124 titles used for HSPs, demonstrating the ambiguity regarding these professionals’ role was an issue noticed decades ago. Recently, Minnick (2013) showed that issues of role ambiguity and conflict affect health and safety professionals in industry, with those working in de-centralised organisations and under a non-formalised work being those affected the most. The author also demonstrated that HSPs reporting higher levels of ambiguity were also the ones experiencing greater role overload.

The President of the Institution for Occupational Safety and Health (IOSH) has highlighted the expansion of the HSPs role and responsibilities as one of the main challenges facing these professionals (Briggs, 2013). Briggs (2013) emphasised that the role has been continually changing and HSPs have all needed to change with it. He added that the role originally classified as “safety advisor” or officer has taken on the health dimension becoming a “health and safety” job, an expansion that has continued enduring changes, broadening the role further and taking on more responsibilities related to environment, quality and security among other areas. Today’s HSP working within companies must be adaptable since they face a constantly evolving work environment and increased complexity in their occupational health and safety work (Brun and Loiselle, 2002).

Several authors have recognized the need to create a “role delineation” in order to structure an area as broad as OHS has shown to be (Kohn *et al.*, 1991; Hale *et al.*, 2005; Husman and Husman, 2006). Recently, research by ENSHPO demonstrated the diversity of the HSP job and recognised the importance of narrowing this role which stills holds a broad job prescription and high heterogeneity across Europe (2013).

The possible ambiguity and confusion on the tasks or responsibilities assigned to the HSPs, the consequent expansion of their job demands and accumulation of tasks are among the main issues raised by the lack of HSPs role definition. Furthermore, research has demonstrated that individuals with a job clearly defined, showed greater work efficacy and higher performance than those with lower role clarity (Smith, 1957; Fried *et al.*, 1998; Tubre and Collins, 2000; Bray and Brawley, 2002). Hence, the absence of a clearly defined role for the HSPs affects, these professionals’ work efficacy but possibly also, the safety performance of the organisation and ultimately the levels of OHS in the company.

3.3. The situation in United Kingdom and Ireland

In the UK and Ireland there is, currently, no legal reference specifying or outlining the main duties or roles of the Occupational Health and Safety Professionals.

According to Regulation 7 of the Management of Health and Safety at Work Regulations 1999 in the UK, an employer should appoint one or more competent persons to assist them in complying with their health and safety

responsibilities. Nevertheless, this regulation does not determine the particular qualifications or requisites required to be considered a “competent person”. Thus, a person shall be regarded as competent where he/she has sufficient training and experience or knowledge and other qualities to enable him/her to properly assist in undertaking the measures.

Looking closer into this, Jones (2005) noticed that, in practice, the main functions developed by HSP in the UK were related to “developing and implementing solutions” and “training, information and communication”. Although not as prevalent as the two categories mentioned above, “regulatory tasks” and “emergency procedures/settlement of damages” showed to be common functions developed by these professionals. The author created a list of the 37 most frequently and commonly performed tasks by HSPs in the UK including, among other, activities such as read and exchange information with colleagues at local or national level, inspect/evaluate workplace/plant risks as well as accidents/incidents and make recommendations, inform/discuss with stakeholders, check legal compliance and provide safety training/workshops.

OHS has a longer history in the UK, where occupational health and safety systems and structures have been set up a great number of years earlier than in Ireland. UK OHS authorities and bodies have been established since 1974 (year of the first Health and Safety at Work Act in the UK (1974)) and diverse guidance and documentation advising on OHS management has been available throughout the years. This has contributed to understanding the OHS requisites and demands to which a HSP practitioner needs to respond to allowing a

somewhat clearer (although not formal) characterisation of this professional's role.

When analysing the scenario in Ireland, the situation becomes slightly more challenging. Similarly, to the UK, there is no document regulating the HSP job or stating the role, rights and duties of this occupation. The Safety, Health and Welfare at Work Act 2005 states that the employer may need to appoint one or more competent persons to assist him/her in complying with safety and health legislation. Nevertheless, a “competent person” could include a person who is able to give informed and appropriate general advice on HS to management as well as a person with specialised technical knowledge of matters such as electrical work, lifting operations, and many others. Additionally, in Ireland there are scarce sources of information on the status, role or general responsibilities of the HSP.

3.4. The relevance of HSPs

In 1984, Dawson *et al.* argued that HSPs should hold an advisory and problem-solving position. However, recent views have recognised the need for a practitioner who is a leader and an agent of change pivotal in driving positive and sustainable compliance, handling crisis, developing strategy, influencing management and changing culture (DeRose, 2004; Broberg and Hermund, 2007; Gaddis, 2013).

Hence, scholars have also concluded that the HSP role goes beyond the guidance and inspection of workers' activities. These professionals should also hold the knowledge and technical competences to be a guiding agent to influence the

organisation, its leaders and line managers in establishing and implementing the safety culture which will lead to safety practices and performance in the company (Blair, 2003).

Research has shown that increasing investment in HSPs was linked to the reduction of accident rates, which was then reflected in improved safety performance (Cameron *et al.*, 2007; Mearns *et al.*, 2010; Cameron *et al.*, 2013). Interestingly, Cameron *et al.* (2007) also noticed that companies with internal HSPs presented an accident rate approximately 60% lower than those resorting to external HS consultancy services. These authors also evidenced that providing the HSPs with authority to make decisions and carry out the necessary OHS actions also lead to lower accident rates (Cameron *et al.*, 2007; Cameron *et al.*, 2013). This was further demonstrated by Dingsdag *et al.* (2008) and Wu *et al.* (2010) who noticed that workers considered the HSPs as those with highest influence on HS at work.

It has, therefore, been argued that companies with HSPs in high-ranking positions show higher safety performance (Cohen, 1977; Cameron *et al.*, 2007). Research has also evidenced that companies with higher safety climate seem to have the presence of a safety manager on site (or higher ranking safety officers) since this professional can be a representation of the true priority of safety in the company (Zohar, 1980; Smith and Wadsworth, 2009). Higher safety climate has been linked with greater safety performance which shows the wide spread impact of the HSPs at all levels in an organisation.

3.5. HSPs and OHS consultants

Hence, a clear distinction between the roles and responsibilities of HSPs working internally in an organisation and those externally contracted to provide health and safety services to a company, is yet to be established. Nevertheless, authors have studied this area and a few differences between these two roles have been noticed.

Firstly, it has been shown that OHS consultants are generally hired by smaller or medium enterprises with limited or restricted resources available to assign to OHS (Cameron *et al.*, 2013). Cameron *et al.* (2013) noticed that companies which only use external consultants had a turnover (representing company size) of less than £ 100 m, with most being under £ 50 m. Additionally the majority of external OHS consultants were hired by companies with turnover below £50m. Conversely, internal HSPs Health and safety advisers can be employed by a wide range of public and large private sector organisations including local authorities, hospitals, construction/engineering companies, colleges and universities, manufacturers, chemical processing plants and food processing/packaging plants among many others (*Health and safety adviser: job description*, 2015).

Safety consultants, who are external to the organisation, provide different types of service depending on the nature and the size of the contracting organisation. These professionals are hired on a contractual basis to provide general OHS advice and guidance or to provide expert service on a particular field of workplace health and safety. From various job advertisements for positions of

OHS consultancy in the UK and Ireland, it seems that these individuals' jobs have a greater focus on ensuring compliance, carrying out audits and workplace inspections and prioritise risk assessment and particular measurements in the workplace. OHS consultants are also responsible for providing reports from the assessments and inspections done with remedial actions and suggested or recommended procedures to implement. Nevertheless, external contractors generally, have little authority in the contracting company and often lack the ability or opportunity to affect change in the organisation (Hale, 1995a; Cameron *et al.*, 2013). Hence, consultants will have limited power to ensure the implementation of the recommended measures, restricted ability to focus on a preventative OHS and will have a smaller influence on the safety culture of the company. As argued by Hale (1995a) external OHS consultants lack the opportunity to influence line management (and through them safety culture) and may not be able to “understand and influence company policy” in the same way their internally employed counterparts. This, according to the author, might stem from the difficulty to build a fully mature and thorough relationship from a position outside the company when the contact between professional [safety consultant] and manager is limited to a few hours per year. Hence, the internal HSP might have a greater ability to drive a more positive safety culture in the company, promoting a greater emphasis on prevention strategies (since they develop internal health and safety policies with management and employees) and ensuring that OHS remains a priority in the organisation.

Internal OHS practitioners are also responsible for performing regular site visits and coordinating OHS meetings. These are an essential platform for open

communication with different levels in the organisation (as all the different levels should be represented at the safety committee). These meetings also allow the HSPs to keep vigilance on relevant ongoing OHS issues and projects contributing to the continuous improvement and the implementation of best practice in the area.

While OHS consultants require knowledge on a broader variety of work environments -as they might provide services to several organisations from diverse activity sectors - the internal HSPs will be able to focus on the specific issues and fields that are relevant to their employer. These can then specialise on the main issues and internal challenges that face their own organisation being better prepared to answer the needs of their employer and workforce, an additional advantage for internal OHS services in an enterprise.

Having an internal HSP employed in the organisation has also shown to have an impact on the safety performance and OHS outcomes in the company. Studies have shown that organisations with internal HSPs have fewer injuries, illness and lower accident rates than those institutions contracting only OHS consultants (Abudayyeh *et al.*, 2006; Cameron *et al.*, 2013). In fact, Cameron *et al.* (2013) has found that companies using only external consultants for their safety advice revealed an average accident incidence rate approximately three times higher than those with internal safety staff.

Nevertheless, although OHS consultancy might show some disadvantages these are also important services particularly in what concerns specialised advice on specific areas of expertise and the supply of tailored expert training on

particular areas in which the internal HSP might not have the required in-depth knowledge or expertise.

3.6. Training and competences of HSPs

The issue of training and HSPs competencies has earned greater attention from scholars in recent years. In his study on these professionals Kohn *et al.* (1991) raised the issue concerning the need to adequately prepare and train HSPs in the US. This topic has also gained special attention from Hale (1995b; a) who has emphasized the importance of adequate training and competences for these practitioners, reflecting on specific areas of training which are of special relevance to them (as presenting information, problem definitions and solutions in a manner that answers management concerns, producing solutions, rather than just making analyses, understanding of the organisation theory, company structure and function, budgeting, planning, amongst other).

Authors have focused on identifying some of the main competences required by HSPs (Blair, 1999; Gual Llorens *et al.*, 2014; Ribeiro and Ventura, 2014) and some of the tailored training programmes and courses available to these professionals in diverse countries (Limborg, 1995; Swuste and Arnoldy, 2003).

In line with this, Arezes and Swuste (2012) were able to provide an overview of the OHS postgraduate courses available in Europe, demonstrating, similarly to Hale (1995b) that the harmonisation of training and education of these practitioners is far from being achieved. With this in mind, scholars are now working towards the creation of a Global OHS Competency Framework as an international standard for HSPs to define the tasks, roles and functions of the

HSPs used to define learning outcomes in education programs as well as the standards of certification and other qualification schemes. According to this initiative, defined competencies help safety professionals identify training and developmental needs. A defined set of core competencies for the OSH profession will facilitate the practice of OSH internationally as it clearly draws a line around the profession's competence terrain (INSHPO - International Network of Safety & Health Practitioner Organisations, 2015).

Lastly, it has become clear that since the studies performed by Hale *et al.* (2005) and Jones (2005) considerable changes have happened in the general work environment, the workforce and organisations. One of the areas where this shift was particularly noticed, concerns the contract types and employment agreements held by workers. A higher amount of individuals are now on different types of contract beyond the more traditional permanent employment which would have been found in the majority of the working population a few decades ago. The need to prepare HSPs to deal with this new types of workers and work arrangements has also been noticed in Leka *et al.* (2008) , as “immigrant/migrant work population” and “non-standard workplaces” were also among the topics which the practitioners identified as desirable training areas.

3.7. New challenges for HSPs: The growing contingent labour force

Considerable changes have happened in the general work environment, the workforce and organisations leading to new role challenges for HSPs. Technological advances and modern market demands lead to a restructuring of

the labour market (Sauter *et al.*, 1999; Kompier, 2006; Leka and Jain, 2010) with new organisational structures resulting in less permanent positions and more temporary, casual or short-term contracts (Aronsson, 1999; Quinlan, 1999).

This has been a continuous trend in the past years generally leading to the increase of contingent workforce (Goudswaard and Andries, 2002). In many companies, two main employment arrangements can be found: core or permanent employers and peripheral or contingent workers (Belous, 1995). Although no particular definition has been established in terms of what typology of contract arrangement should be considered 'contingent work', this generally includes individuals with arrangements ranging from fixed-term contract (and project based arrangement), temporary-help service, seasonal employment and employee leasing to a self-employment position (Aronsson, 1999; Clarke, 2003).

At European level, statistics have shown a general increment in the percentage of contingent workers in the past years, from 12.3% in 2002 to 13.7% in 2012 across the EU-28. An even greater increase was verified in Ireland from a 5.3% average of contingent workers in 2002, to 10.2% for 2012 (Eurostat, 2013).

There is a growing body of scientific data evidencing the differences in the work characteristics of contingent work arrangements and in the level of health and wellbeing and the protection by OHS of the contingent workforce when compared to the permanent work force.

In what concerns work characteristics, research has shown that contingent workers are, overall, placed at higher risk jobs (and with poorer conditions) and have less access to training than permanent employees (Kochan *et al.*, 1994; Aronsson, 1999; Quinlan, 1999; Park and Butler, 2001; Goudswaard and Andries, 2002; Guadalupe, 2003).

The links between the job characteristics of the contingent workforce and a higher incidence of occupational health and safety issues, higher level of psychosocial work-related issues (perceptions of higher job demands and lower control, fatigue, lower job satisfaction, among others) and physiological health complaints (such as back and muscular pain, heart disease, musculoskeletal disorders, among others), have been well established throughout the empirical literature (Bosma *et al.*, 1998; Benach *et al.*, 2002; Goudswaard and Andries, 2002; Bernhard-Oettel *et al.*, 2005; Silla *et al.*, 2005).

In line with Leka *et al.* (2008) it is, therefore, important that HSPs are aware of the specific characteristics of new contractual types and the working conditions of these new groups of workers in order to efficiently and effectively answer the needs of employees and address the OHS challenges in their organisations.

Nevertheless, further research is still required to understand how the new changes in the workplace and the labour restructuring might impact on the safety culture of organisations and affect the role and tasks performed by the HSPs. With clearer knowledge on the current demands, responsibilities and activities required from the HSPs, it will then be possible to adequately adjust

the training and provide the needed competences to these practitioners allowing an optimal performance at their job.

4. Safety Climate

Safety climate (SC) refers to employees' shared perceptions of safety, policies, procedures, practices, as well as the overall importance and true priority of safety within the organisation (Griffin and Neal, 2000; Zohar and Luria, 2004; Pousette *et al.*, 2008; Jiang *et al.*, 2010). This multi-dimensional concept is regarded as an important antecedent of safety in the workplace (Vinodkumar and Bhasi, 2008).

Although some confusion still surrounds this area and safety climate and safety culture are still often addressed interchangeably or as one and the same, these are two distinct concepts. It is generally understood that safety culture regards the “attitudes, beliefs, assumptions, and values that employees share in relation to safety in a company” (Guldenmund, 2000; Seo *et al.*, 2004) whereas safety climate emphasizes the perceptions held by employees regarding the importance of safety in their organisation (DeJoy *et al.*, 2004).

Several authors have clarified that safety climate represents the surface features of the safety culture discerned from the workforce's attitudes and perceptions at a given point in time (Schneider and Gunnarson, 1991; Cox and Flin, 1998). In a more practical way Flin *et al.* (2000) affirmed that it is a snapshot of the state of safety providing an indicator of the underlying safety culture of a work group, plant or organisation. Additionally, in his more recent

work in the area of safety climate, Zohar (2000) has reviewed this concept and suggested that it is a construct that reflects the true priority of safety within an organisation.

With this in mind, culture refers to beliefs about ‘the way we do things around here’, while climate captures perceptions about what is actually done – it is thus a check on whether the behaviour of the people within the company, especially management and supervisors, matches the rhetoric (Shannon and Norman, 2008). Therefore, authors have also stated that one can consider that “culture exists at a higher level of abstraction than climate, and climate is a manifestation of culture” (Schein, 1992; Coyle *et al.*, 1995; Cox and Flin, 1998; Glendon and Stanton, 2000; Guldenmund, 2000).

SC is known to have an impact on safety behaviour, safety outcomes and Occupational Health and Safety (OHS) performance. In his original work Zohar (1980) was also able to relate the values and priorities of an organisation to its safety levels and performance through this concept. According to this author, SC has not only a theoretical but also a practical significance (Zohar, 1980). One of this concept’s main implications lies in the fact that management commitment to safety, with its multitude of expressions, is a major factor affecting the success of safety programs in organisations. Thus, one can presume that a genuine change in management attitudes and increased commitment are prerequisites for any successful attempt at improving the safety level in organisations (Zohar, 1980).

A generally positive and supportive safety climate should influence the extent to which employees perceive that safety is important within their organisation. In fact, research has evidenced that employees' perceptions regarding the organisation's commitment to safety are a core ingredient in shaping a positive SC (DeJoy *et al.*, 2004). As Snyder *et al.* (2008) pointed out, a positive safety climate suggests that the organisation values employees on a personal level, supports their health and wellness, and chooses their safety over productivity when the two are at odds.

Employees pay particular attention to managerial action; when there is strong pressure to meet production deadlines, or when the required safety devices are costly, these will be assigned greater weight by employees in assessing true priorities (Zohar, 2003).

In his previous work, Zohar (1980) also highlighted the importance of integrating SC in the regular running of the company and as a component of the management of the organisation:

“Often, management views safety as a technical and independent aspect of the production process, detached from other management operations. Yet, not willing to ignore its responsibility in this regard (and complying with government regulations), management assigns all responsibility to specified safety personnel without delegating to them any executive power. (...) Safety should be regarded as an integral part of the production system closely related to the overall degree of control management has over production processes.”

With all the above in mind, one can comprehend the important role of management on Safety Climate and how this concept is built on different levels also impacting on the management of OHS in the organisation. In his work exploring this area, Zohar (2003) mentioned a Multilevel Model of Safety Climate. This model becomes quite clear in an organisation where top managers are concerned with policy making and establishing procedures to facilitate policy implementation and supervisors at lower hierarchical levels execute these policies and associated procedures through interaction with subordinates. “This creates potential for a discrepancy between formal and executed policy, including a reflexive discrepancy whereby top managers do not implement their own formal policies” (Zohar, 2003).

Thus, SC emerges as a measure of the practices and management of OHS in an organisation providing a clearer picture of what is done. However, it also allows institutions to have a clearer understanding of some of the underlying issues that might be affecting their OHS. An organisation might have policies and procedures in place, however, as previously argued, if some of the underlying values or visions are missing or “misaligned” (e.g. if there is poor commitment from management, lack of communication or other additional issues) the manner in which work practices and health and safety are performed might not be in accord with these policies. Hence, SC offers a clearer view of the issues that might be undermining an optimal OHS in a company and a better understanding of the essential aspects of a strong and positive OHS management.

Conversely, as it measures the individuals' perceptions of the true priority of safety and OHS practices in the organisation, SC can also impact on the behaviour and practices of individuals. As previously explained, a stronger SC may represent an environment where individuals might feel a greater focus on OHS and an organisational ethos where this area is valued at the same level (or higher level) as production. In such a scenario, supervisors might convey these values and encourage the practice of healthier and safer actions, behaviours and procedures which are then acted upon by the workforce. This is ultimately reflected on a better safety performance and greater health and wellbeing in the workforce.

Employees in an environment as the one described above may also be more pro-active and engaged in OHS matters, with greater awareness of the issues and potential problems surrounding them, allowing for a greater involvement in OHS. This is also an essential part of a healthy OHS management system, as involvement at all levels of the organisation is upheld, supporting and encouraging the promotion and implementation of healthier and safer practices.

Some indicators of true priorities in the organisation include procedural features such as the effect of safe conduct on personnel decisions, management attitudes, individuals' involvement in safety, investment in continuing safety training, timely communication of safety information and (real) status of the HSP (Zohar, 2003).

It is, therefore assumed that an organisation with strong safety climate will hold OHS higher in their priorities and, by extension, the work of the HSP will also be seen as relevant. Thus, one can presume that in these organisations the resistance to OHS actions and to the measures suggested or applied by the HSP may be lower than in those where safety climate is weaker. Additionally, in an environment where OHS is held as high priority by management, the amount of safety issues raised as well as their severity will be lower (considering that stronger measures and procedures will be in place), facilitating the HSPs' action (Zohar, 2003). It becomes, therefore understandable, that SC can also affect the work task and professional activities of HSPs in organisations.

As a novel approach in this doctoral research, I will also study safety climate as a group of factors affecting the working conditions of HSPs and affecting, not only their work efficacy (ensuring healthy and safe working conditions for their workforce and an adequate management of OHS) but also for their own occupational health and wellbeing. As argued above, it is seen that this concept is related to the HSPs at two different levels: **professionally**, as they carry out their professional OHS duties within the values of SC in a particular organisation and at **personal level**, as the SC in the organisation may affect their own working conditions, and their personal health and wellbeing.

4.1. Psychosocial safety climate

Psychosocial safety relates to freedom from psychological and social risk or harm while, psychosocial safety climate refers to shared workers' perceptions regarding policies, practices, and procedures in the company, reflecting the

communicated position from the organisation about the value of the psychosocial health and safety of employees (Dollard and Bakker, 2010; Dollard *et al.*, 2012). Dollard and Bakker (2010) understand low PSC as “the pre-eminent psychosocial risk factor at work capable of causing psychological and social harm through its influence on other psychosocial risk factors” (Dollard and Bakker, 2010, pg. 580). Low levels of PSC would be indicative of the failure of senior managers/supervisors to value workers’ psychosocial well-being in the workplace and would result in increased job demands and reduced job resources.

“Psychosocial safety climate” is a distinct concept from “safety climate”. Generally, safety climate is studied as a concept with impact on the physical health of individuals and the sustainability of organisations. This is generally seen as a climate for health and safety, and is shown to predict individual safety behaviour (Coyle *et al.*, 1995; Neal and Griffin, 2002; Clarke, 2006c; Vinodkumar and Bhasi, 2009), industrial accidents (Hofmann and Stetzer, 1996; Mearns *et al.*, 2003; Desai *et al.*, 2006; Neal and Griffin, 2006; Nielsen *et al.*, 2008b; Payne *et al.*, 2009; Vinodkumar and Bhasi, 2009), and injury to physical health (Isla Diaz and Diaz Cabrera, 1997; Beus *et al.*, 2010; Arcury *et al.*, 2012).

Research focussing on the links between SC and psychosocial wellbeing or mental health of the workforce is still quite scarce. On the other hand, a strong body of research has emerged which investigates these outcomes through the application of the concept of psychosocial safety climate (PSC).

Various studies (Dollard and Bakker, 2010; Law *et al.*, 2011; Dollard *et al.*, 2012; Idris *et al.*, 2012; Hall *et al.*, 2013) explored the association between psychosocial safety climate and mental health outcomes such as depression, emotional exhaustion, psychological health problems and strain, among others. However, PSC, as previously mentioned, is a facet-specific component of organisational climate, defined as policies, practices, and procedures for the protection of worker psychological health and safety (Dollard, 2007) differing, therefore, from Zohar's (1980; 2003; 2010) concept of SC.

Although PSC explores an important area of OHS which seems to have been previously overlooked, it is particularly focussed on the mental and psychosocial health outcomes in the workforce as shown above. Conversely, empirical data on SC seems to direct its attention to the effects which SC may have on the physical health of individuals. Hence, two clearly distinct streams of research can be identified currently in this field: SC, exploring the link between the organisational work environment and physical health; PSC, studying the effect that this work environment might have on the psychosocial wellbeing.

In this doctoral research, I intend to bring these two views together with the understanding that SC can have an impact on both the physical health and psychosocial wellbeing of individuals as these two areas are not isolated from each other (Malt, 1988; Dersh *et al.*, 2002; Chandola *et al.*, 2006b). Additionally, it is known that the work environment, the policies and practices put in place in the workplace affect individuals not just at the physical level (Kivimäki *et al.*, 2012; Gilbert-Ouimet *et al.*, 2014; Bailey *et al.*, 2015) but also at the psychosocial level as well (Leka and Jain, 2010; Karlsson *et al.*, 2012; Cendales

et al., 2014). Hence, it seems sensible to study both physical and psychosocial health together, as possible outcomes of the levels of SC observed in the workplace.

4.2. Health Climate

The concept of Health Climate (HC) has emerged as a particular aspect of organisational climate that represents workers' shared perceptions of an organisation's priorities and practices regarding employee health (Basen-Engquist *et al.*, 1998; Mearns *et al.*, 2010).

In line with safety climate's representation of individuals' perceptions of the priority of safety in the company, health climate reflects how employees perceive organisational health-related efforts and the way they experience their company is caring for their well-being (Ernsting *et al.*, 2013).

With the increased attention gained by the area of workplace health promotion, various authors have studied the relationship of organisational climate with health behaviours and participation in health promotion interventions and programs at work (Cotton and Hart, 2003; DeJoy and Wilson, 2003; Langford, 2009; Lin and Lin, 2013; Sonnentag and Pundt, 2016).

Although the concept of HC has gained growing attention in the past years and efforts have been made to define and conceptualise this concept, further work is still required for the study and validation of reliable measures of the underlying dimensions of this climate (Ribisl and Reischl, 1993; Basen-Engquist *et al.*, 1998).

A few measures have been developed for the assessment of HC such as the “Organisational support scales” - focussing on health-related construct influenced by organisational policies and practices – by Ribisl and Reischl (1993), the “Multifaceted Organisational Health Climate Assessment” (MOHCA) by Zweber *et al.* (2015) and the “Health and Safety Climate” scale by Basen-Engquist *et al.* (1998). However, empirical evidence on their validity, applicability and reliability is still highly scarce and it becomes clear that this is an area requiring further work.

Although authors have argued the link HC can have with physical and psychosocial health, empirical evidence on this is also sparse (Zweber, 2014). Nevertheless, recently, additional research has been developed in this area exploring the relationships of this concept with health outcomes. While Zweber *et al.* (2015) were not able to provide evidence of a direct link between HC and physical health, the authors showed a significant association between this climate and mental health. This study was, additionally, able to demonstrate the important indirect effect of HC on improved health measures such as body fat and hand grip, which alluded to a potential long-term effect of HC. It was also evidenced that HC could lead to improved health behaviour which, in the longer term, offers important benefits for workers and employers (Zweber *et al.*, 2015).

Ernsting *et al.* (2013) also demonstrated the value of HC as a job resource able to strengthen affective commitment of workers towards their organisation - employees’ sense of loyalty or commitment towards their company (Fernandez-Lores *et al.*, 2016).

Nevertheless, further and clearer evidence on the impact of organisational health climate on employee physical and psychosocial health outcomes is still needed to build a stronger case to higher management and organisational leaders about the importance of a positive HC (Zweber, 2014).

With this in mind, the concept of health climate will also be approached in this doctoral research as new avenue to study the possible impact that an organisation's practices, policies and priorities towards the protection and promotion of the health of its workforce may have on the health and wellbeing of employees. This will be explored further in paper 4 - *Safety and Health Climate and Job Demand-Control-Support – the link with Health and Safety Practitioners* (Chapter 5).

5. Occupational psychosocial risk factors

Work has changed in past years which resulted in a shift of the focus of OHS (Sparks *et al.*, 2001). New concepts and streams of thought have been introduced to deal with issues not previously addressed by the traditional beliefs and practices of OHS, such as psychosocial and organisational risk factors.

Recent decades, in particular, have brought factors such as the economic downturn, pressures of globalization and fast-paced technical innovations, which led organisations to restructure themselves (Kompier, 2006). Establishments were compelled to adopt new styles of management and policies, incorporate different types of production processes and make the

necessary adjustments for their business to strive in this time of change (Sauter *et al.*, 1999).

Along with these adjustments by industry, the conditions of work and employment have also changed significantly bringing reduced-work stability and security, variable work and team structures, higher skill demands, and a requirement for greater flexibility, amongst others (Sauter *et al.*, 1999; Leka and Jain, 2010).

With the onset of all these changes in the work environment, work organization came to the forefront of concerns in OHS (Sauter *et al.*, 1999). There is now a high degree of awareness that the structure and fabric of the organization, and how it functions, could have a wide-ranging impact on the health and wellbeing of employees, and ultimately the effectiveness of the organization itself (Wilson *et al.*, 2004). It is also known that positive organisational and psychosocial work factors act as protective agents against long term sick leave and depression symptoms (Munir *et al.*, 2011).

Psychosocial (and organisational) risk factors, according to the International Labour Organization (International Labour Organization (ILO), 1986), are understood as the interactions between job content, work organisation and management and other environmental and organisational conditions on the one hand, and the employees' competencies and needs on the other. These are characteristics of the work environment which can have an emotional or cognitive implication for workers and managers, with the potential to result in strain, stress and other health consequences. Psychosocial and organisational

risk factors relate to the way work is structured, distributed, processed and supervised (Hagberg *et al.*, 1995), its design and management, and its social and organisational contexts that have the potential for causing psychological or physical harm (Carayon and Lim, 1999; Cox and Griffiths, 2005; Leka and Jain, 2010).

Further knowledge on the various psychosocial and organisational risk factors affecting the workforce and a greater understanding of the best way to manage them is, therefore, essential for practitioners, employees, employers but also agencies and policy makers.

5.1. The magnitude of the “psychosocial risk factors” issue

In 2002, the European Commission estimated that the costs of work-related stress in the EU-15 were approximately of €20 billion a year. This value encompassed costs to employers resulting from absenteeism and presenteeism (€272 billion), loss of productivity (€242 billion), health care costs of €63 billion and social welfare costs in the form of disability benefit payments (€39 billion) (EU-OSHA, 2014).

Data from the Pan-European opinion poll on occupational health and safety in 2012 demonstrated that psychosocial work-related risk factors were still a large source of concern among the workforce as more than half of the respondents predicted an increase in the levels of work-related stress between 2012 and 2017 (figure 1.2).

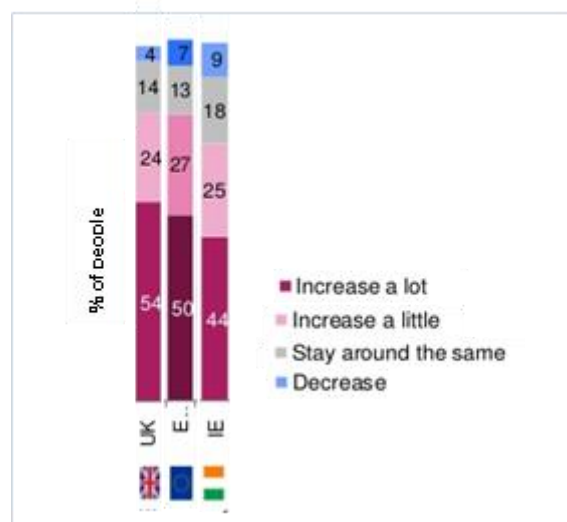


Figure 1.2 – Proportion of people who believe the level of work-related stress would increase in the next five years (adapted from Pan-European poll. EU-OSHA, 2012).

Recent data has made clear that, more than the physical hazards, it is the psychosocial hazards that have become the greatest cause for concern and the highest source of occupational health issues. The Pan-European opinion poll on occupational health and safety in 2013 showed that job reorganisation or job insecurity (72%) were the top cause of work-related stress among European workers. Hours of work or workload (66%) and unacceptable behaviour, bullying or harassment (59%) were also among the most reported sources of work-related stress. These data were recently reiterated by the Second European Survey of Enterprises on New and Emerging Risks (ESENER-2) (2015) as having to deal with difficult customers (58%) was the top workplace hazard reported by managers in European organisations. Experiencing time pressure at work (43%) was also among the most frequent psychosocial hazards in European workplaces (European Agency for Safety and Health at Work (EU-OSHA), 2015). As an additional challenge, almost one in five of the

organisations reporting the above issues also declared lacking information or adequate tools to deal with the risk effectively (European Agency for Safety and Health at Work (EU-OSHA), 2015). ESENER-2 also shows that a reluctance to talk openly about these issues seems to be the main difficulty for addressing psychosocial risks (30 % of establishments in the EU-28).

Looking into the progress of the prevention and management of psychosocial risk factors over the years, Malard *et al.* (2013) was also able to show that particular factors had improved in 2010 as compared to 2005, such as workplace violence, working hours, job promotion, effort, bullying, sexual harassment and work–life imbalance. However, this author observed that other psychosocial risk factors had deteriorated, in particular, job insecurity, skill discretion, and decision latitude.

At the UK and Irish level, recent empirical data showed that mental health disorders were the main issues affecting workers in these countries between 2005 and 2012 (Money *et al.*, 2015). The percentage of mental health disorders in these countries reported by occupational health physicians or general practitioners (ROI 51%, NI 61% and GB 56%) was higher than the proportion of reported musculoskeletal disorders or other conditions reported by skin or pulmonary specialists (Money *et al.*, 2015).

5.2. A new OHS approach

Occupational Health and Safety Practitioners (HSPs) were traditionally well-equipped to address physical, biological, and chemical hazards in the workplace as well as the physical injuries and illnesses that result from exposure to these

hazards. However, the OHS community has been increasingly confronted by hazards and disorders, such as organisational stressors and stress-related illness that fall outside this framework, challenging the biomedical model (Sauter *et al.*, 1999). With these changes to both the content and context of work, it was understood that the relationship between work settings and health and wellbeing is complex. The sole consideration of physical hazards became inadequate, and both academics and practitioners noticed that new models of were needed to also address psychological factors in the workplace (Danna and Griffin, 1999) and which supported a multidisciplinary approach to OHS management, with inclusion of different areas as health promotion (HP) and psychology (Diaz-Cabrera *et al.*, 2010).

In 2004, the development of the European Framework for Psychosocial Risk Management (PRIMA-EF) started. This framework's aim is to offer a unifying approach of best practice in psychosocial risk management (PRM) to be promoted at international level with the support of the WHO and European Commission. Thus, the PRIMA-EF gathers the key elements and knowledge of psychosocial risk management best practice models across Europe, unifying and reconciling these for the harmonisation of practice and methods used in this area, while also serving as a guidance tool for the development of further methods (promoting, in this way, the continuous improvement of PRM) (Leka and Cox, 2008; Leka *et al.*, 2011a).

5.3. Main psychosocial hazards

Throughout the years, numerous significant psychosocial and organisational work-related hazards have been identified as aspects with impact on workers and OHS. According to Cox and Griffiths (2005) psychosocial hazards are features of the design and management of work, and its social and organisational contexts that have the potential for causing psychological or physical harm.

The PRIMA-EF has classified the most significant psychosocial hazards into, essentially, ten groups. According to this framework, the main psychosocial work-related hazards can be classified as displayed in table 1.2.

Although there is a generable agreement in the literature on psychosocial hazards, it is important to bear in mind that new forms of work give rise to new hazards – not all of which are yet presented in empirical data (González *et al.*, 2010).

Originally, authors noticed that workplace characteristics ranging from health and safety practices by the organization (Demerouti *et al.*, 2004; Pitsopoulos and Greenwood, 2004; Pisarski *et al.*, 2008) to work design issues associated with basic ergonomics (Thomas *et al.*, 1995; Robertson *et al.*, 2008) – **working environment** – work under or over-load, and pace, high levels of time pressure – **workload & pace** – had negative impacts on individuals (Danna and Griffin, 1999; Leka and Jain, 2010; Costa and Santos, 2013; Malard *et al.*, 2013; Laine *et al.*, 2014).

Table 1.2 – Psychosocial work-related hazards as per PRIMA-EF classification
(adapted from Leka and Cox (2008).

Work-related Psychosocial Hazards	
Environment & equipment	Inadequate equipment availability, suitability or maintenance; poor environmental conditions such as lack of space, poor lighting, excessive noise.
Workload & work pace	Work overload or under load, machine pacing, high levels of time pressure, continually subject to deadlines.
Interpersonal relationships at work	Social or physical isolation, poor relationships with superiors or co-workers, interpersonal conflict, lack of social support
Work schedule	Shift working, night shifts, inflexible work schedules, and unpredictable hours, long or unsociable hours.
Job content	Lack of variety or short work cycles, fragmented or meaningless work, under use of skills, high uncertainty, continuous exposure to people through work.
Role in organisation	Role ambiguity, role conflict and responsibility for people
Control	Low participation in decision making, lack of control over workload, pacing, shift working, etc.
Career development	Career stagnation and uncertainty, under promotion or over promotion, poor pay, job insecurity, low social value to work.
Home-work interface	Conflicting demands of work and home, low support at home, dual career problems.
Organisational culture & function	Poor communication, low levels of support for problem-solving and personal development, lack of definition of, or agreement on, organisational objectives.

Furthermore, the nature of the relationship at work with superiors, colleagues, subordinates, and possible interpersonal conflict or lack of social support – **interpersonal relationships** - have been implicated in health and wellbeing outcomes (Ylipaavalniemi *et al.*, 2005; Rugulies *et al.*, 2007; Geldart *et al.*, 2010; Leka and Jain, 2010; Afshin *et al.*, 2012; Leiter *et al.*, 2015). This has been further linked to feelings of procedural and relational justice which, in turn, have shown to lead to stress-related disorders (Nieuwenhuijsen *et al.*, 2010;

Singh *et al.*, 2013). Similarly, a work environment where co-workers and supervisors are supportive of employees' psychological and mental health concerns, and respond appropriately as needed is also essential (Burton, 2010).

Various other elements of work have been identified as significant aspects for the health and wellbeing of workers. These include workplace aggression (Rugulies *et al.*, 2007)), workplace violence (Landsbergis, 2003a), bullying or harassment (McDonald, 2012; Nielsen and Einarsen, 2012; Neall and Tuckey, 2014), various forms of dysfunctional behaviour (Hershcovis, 2011; Anthony Geoffrey Sheard, 2013) and social or physical isolation (Danna and Griffin, 1999; Leka and Jain, 2010). Psychosocial risks, work-related stress, violence, harassment, bullying (or mobbing) are now also widely recognised as major challenges to OHS (Leka and Jain, 2010; Eurofound and EU-OSHA, 2014; International Labour Organization (ILO), 2014; Laine *et al.*, 2014).

PRIMA-EF also encompasses hazards such as violence, bullying and harassment at work, however this framework considers these a multiform phenomenon which should be seen as the consequence of one of the factors listed in table 1.2 (Leka and Cox, 2008).

It is important to bear in mind that organisational work factors can also contribute to the level of exposure to physical hazards on the job, for example, workers working extended work hours may be at risk of exceeding permissible exposure limits to hazardous substances (Landsbergis, 2003a). Increased public contact and alternative work schedules (such as shift work), may expose workers to an increased risk of violence on the job or anti-social behaviours.

Factors intrinsic to the job as shift work, long hours, travel, risk and danger, new technologies (**work schedule**) and **job content** (variety tasks, work cycles, fragmented or meaningless work, under use of skills, high uncertainty) have also proven to be important for the maintenance of the health and wellbeing of the workforce (Sparks *et al.*, 2001; Silla *et al.*, 2005; Stansfeld and Candy, 2006a; Leka and Jain, 2010).

Recent literature has shown that **role in the organisation** (role ambiguity, role conflict, and the degree of responsibility for others) and **level of control** (for instance, low participation in decision making) can have significant effects on the health and wellbeing of individuals as well (Burton *et al.*, 1999; Carayon and Lim, 1999; Arezes and Swuste, 2012). Furthermore, factors linked to **career development**, job insecurity, social value of work are also known to be important (Sparks *et al.*, 2001; Silla *et al.*, 2005; Stansfeld and Candy, 2006a; Leka and Jain, 2010).

The **home-work interface** (work-life balance) is also an important factor in the general health of individuals (Joyce *et al.*, 2010; Laine *et al.*, 2014; Lunau *et al.*, 2014) considering that, on the one hand, the interaction between work and the family can be a source of pressure itself and, on the other, this relationship can be a source of “spill-over” stress as well. A positive environment where there is recognition of the need for balance between the demands of work, family and personal life is, therefore, essential (Burton, 2010).

As clarified by Leka and Jain (2010), psychosocial hazards and work-related stress can stem from **organisational culture** and management styles. A work

environment where there is effective leadership and support that helps employees understand how their work contributes to the organization, that promotes worker involvement open consultation across stakeholders and communicates whether there are impending changes happening is also considered a positive workplace (Burton *et al.*, 1999; Carayon and Lim, 1999).

Furthermore, an organisational culture with strong communication, adequate levels of support for problem solving and personal development, with recognition and reward is also one that promotes a stronger a healthier workforce (Danna and Griffin, 1999; Burton, 2010).

The work environments described above should then characterise a workplace that staff can enjoy and where they feel connected to their work, and feel motivated to do their job well, thus benefiting from greater health and wellbeing (Burton, 2010). Additionally, it has been shown that work engagement is linked to workers' wellbeing as well as higher productivity (Schaufeli *et al.*, 2006; Right Management, 2009; Bakker *et al.*, 2010). Hence, these authors have shown that individuals with a greater feeling of dedication and absorption at work, experiencing their job as something stimulating and energetic report better health and wellbeing but also are highly energetic and self-efficacious employees (Bakker *et al.*, 2010).

Organisations and employers, conversely, can avail of many advantages of a strong psychosocial work environment concerning higher performance and productivity, cost reductions and numerous other business-related benefits such as more inspired employees, improved quality of personnel (leadership,

work style, competencies), reduction of workers' sickness absence compensation and of insurance premiums for health, reduction of costs related to staff turnover and replacement of workers on sick leave, amongst others (Zwetsloot *et al.*, 2010).

5.4. Epidemiological research linking work-related psychosocial risk factors to physical and mental health

Researchers and managers have generally recognised that health and wellbeing can affect both workers and organizations in negative ways (Danna and Griffin, 1999). There is strong evidence to indicate that the exposure to psychosocial risk factors or their interaction with physical hazards can lead to an array of health issues (Cox *et al.*, 2000; Stansfeld and Candy, 2006a; Koukoulaki, 2010; Leka and Jain, 2010; Karlsson *et al.*, 2012).

On the one hand, psychosocial work-related risk factors have been shown to have detrimental impact on worker's physical health. Empirical data has shown the link between these factors and cardiovascular disease (Bosma *et al.*, 1998; Kivimäki *et al.*, 2012; Steptoe and Kivimaki, 2012; Gilbert-Ouimet *et al.*, 2014), metabolic syndrome (Bernhard-Oettel *et al.*, 2005), musculoskeletal disorders (Eatough *et al.*, 2012; Bailey *et al.*, 2015) among other physical conditions.

On the other hand, organisational and psychosocial risk factors are also associated to a range of psychological and psychiatric conditions such as depression, anxiety (Tennant, 2001; Ylipaavalniemi *et al.*, 2005; Niedhammer *et al.*, 2015), burnout (Wisniewski and Gargiulo, 1997; Bragard *et al.*, 2014; Leiter *et al.*, 2015) stress related disorders (Stansfeld and Candy, 2006b) and various

other conditions (Nielsen and Einarsen, 2012; Boschman *et al.*, 2013; Bronkhorst *et al.*, 2015; Elovainio, 2015).

However, the impacts of psychosocial risk factors are not limited to the individuals. It is important to bear in mind that factors that influence employee health and wellbeing can have a significant impact on the financial health and profitability of an organisation (Danna and Griffin, 1999). Research has evidenced both a direct and indirect link of psychosocial risk factors on organisational indices such as absenteeism, sickness absence, productivity, job satisfaction, early retirement and staff turnover (Goetzel *et al.*, 2002; Guest, 2002; Harter *et al.*, 2002; Rugulies *et al.*, 2007; Roelen *et al.*, 2008; Bevan, 2010; Thorsen *et al.*, 2012; Hinkka *et al.*, 2013).

Studies have also demonstrated the impact of psychosocial risk factors on safety indices as workplaces with unfavourable psychosocial conditions seem to show higher accident and injury rate (Landsbergis, 2003b; Geldart *et al.*, 2010; Karlsson *et al.*, 2012; Hinkka *et al.*, 2013; Johannessen *et al.*, 2015).

The indirect costs associated with workplace accidents, including the incalculable costs of lost production and efficiency on a company have been widely discussed. These cost stem from absenteeism, lost time of uninjured co-workers, equipment and material repair and replacement and training of replacement workers. In addition, in the long run, these factors lead to a variety of other consequences related to loss of productivity time, lower production, remedial and compliance costs for equipment safeguard, health insurance

expenses and costs of compensable disorders as well as criminal negligence charges (Danna and Griffin, 1999; Zwetsloot *et al.*, 2010).

Numerous studies have been able to demonstrate the impact psychosocial risk factors can have on individuals' health. Psychosocial risk models have provided solid scientific knowledge regarding the vital link between social or psychological phenomena at work and the development of several diseases (Vezina *et al.*, 2004). One of these well-established models is the Job Demand-Control-Support (JD-CS) by Karasek (1979). This theory is based on empirical evidence that "the manner in which work is organised - in psychological and social terms - fundamentally affects the health and wellbeing of workers" (Cahill, 1996).

Originally, this model suggested that high job demands and low job control (decision latitude) were the key factors that together produced job strain, increasing the risk of physical and mental illness (Karasek, 1979; Theorell and Karasek, 1990; Karasek *et al.*, 1998). Further research from Johnson and Hall (1988) noticed that support received from supervisors and colleagues, often buffered the impact of demands and control on outcome variables (such as health, wellbeing and performance). This led to an evolution of the model and to the inclusion of the "social support" dimension.

Various other theories have also studied the impact of organisational and psychosocial risks on the health and wellbeing of the individuals. Models validated throughout an extensive body of research such as the Effort-reward Imbalance model (Siegrist, 1996), the Job Demand-Resource model (Demerouti *et al.*, 2001; Bakker and Demerouti, 2007), the Person-environment Fit theory,

amongst others (Schabracq et al., 2003; Calnan et al., 2004; Jovanovic et al., 2006; Hakanen et al., 2008; "New developments in theoretical and conceptual approaches to job stress", 2010) have been able to show the variety of factors in the work environment which affect individuals in numerous and complex ways.

6. Healthy Workplace Framework

As mentioned in the previous section, one of the essential elements of a healthy work organisation is the promotion of health and wellbeing, including psychosocial wellbeing (Danna and Griffin, 1999; Burton, 2010). A healthy and strong workforce is a vital asset for any organisation (Zwetsloot *et al.*, 2010). Hence, OHS management and health promotion (HP) have become increasingly valuable for companies.

The concept of “healthy workplace” emerged from the acknowledgement that organisational and psychosocial risk factors have a crucial role on individuals’ wellbeing and companies’ sustainability and success (DeJoy *et al.*, 2010).

A healthy organization is one characterized by intentional, systematic, and collaborative efforts to maximize employee wellbeing and productivity by providing well-designed and meaningful jobs, a supportive social-organisational environment, and accessible and equitable opportunities for career and work-life enhancement (Wilson *et al.*, 2004).

Recently the WHO has operationalised this concept by establishing the “healthy workplace framework” (figure 1.3). According to this framework, a healthy workplace is one where workers and managers collaborate in the application of

a continual improvement process to protect and promote the health, safety and wellbeing of all workers. These work environments also base their success on specific OHS priorities and concerns in both the physical and psychosocial work environment (including organization of work and workplace culture). Finally, according to the WHO, a healthy workplace also considers health promotion in the workplace for its employees as well as the community to improve the wellbeing of workers, their families and other members of the community (Burton, 2010).

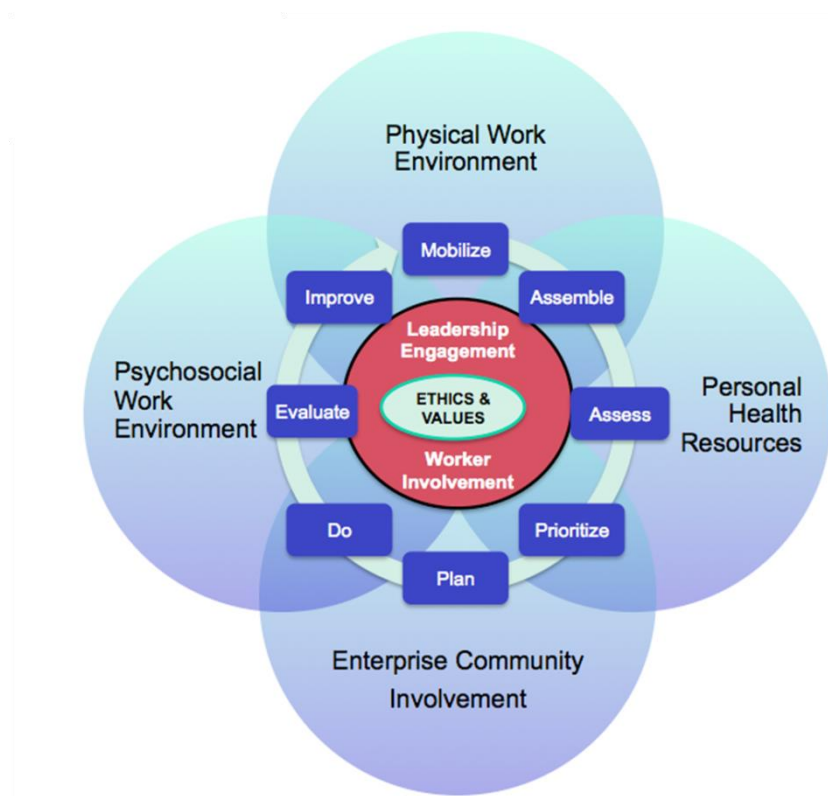


Figure 1.3 – Healthy Workplace Framework (WHO - Burton, 2010)

Hence, the “healthy workplace framework” brings a new essential view to OHS with a holistic approach which joins the physical and psychosocial workplace

conditions and considers its impact on the general health, mental wellbeing of the workforce and potential consequences to the organisation. The vision of continuous improvement is also in the core of this model which endeavours for its stakeholders to jointly develop, apply and continuously improve a comprehensive process to protect and promote the health, safety and wellbeing of all workers and the sustainability of the workplace. Hence, the eight steps for continuous improvement (a management systems approach) incorporating knowledge transfer and action research are essential in the implementation of this framework: Mobilize; Assemble; Assess; Prioritize; Plan; Do; Evaluate (Kortum 2014 & Burton 2010).

In sum, this concept proposes that beyond the business profits, employees' wellbeing should also be a priority for organisations (Raya and Panneerselvam, 2013).

This framework is focused on four main areas (Burton, 2010), as shown on figure 1.3:

- **The Physical Work Environment**, understood as the part of the workplace facility that can be detected by human or electronic senses, including equipment, machinery and structures with which the individuals interact as well as the natural elements, materials or agents to which workers are exposed and that may have an impact on the physical or mental safety, health and wellbeing of workers.
- **The Psychosocial Work Environment**, regarding the culture and climate of the organisation, the attitudes, values, beliefs and practices

that are regularly demonstrated in the enterprise, and which affect the general health and mental wellbeing of workers. These are factors generally mentioned as psychosocial stressors with impact on the health of the workforce and which relate to the diverse psychosocial hazards (which were referred to in the previous section of this thesis) such as job demands, job control and role ambiguity and many others. The interpersonal and social relations that affect behaviour and development in the workplace are also an important element of psychosocial work environment which encompasses any aspect that might lead to emotional or mental distress.

- **Personal Health Resources in the Workplace**, concerning the supportive environment, health services, information, resources, opportunities and flexibility an enterprise provides to workers to support or motivate their efforts to improve or maintain healthy personal lifestyle practices, as well as to monitor and support their ongoing physical and mental health.
- **Enterprise Community Involvement** comprising the activities, expertise, and other resources an enterprise engages in or provides to the social and physical community or communities in which it operates; and which affect the physical and mental health, safety and wellbeing of workers and their families. Burton (2010), elucidates this further by clarifying that enterprises exist in communities, affect and are affected by those communities. Since workers live in the communities, their health is affected by the community physical and social environment.

Actions in all four areas of this framework should be planned and addressed collectively as these are synergistic fields and have shown to be more efficient than isolated actions on the areas of influence only (Kortum, 2014). This framework also clarifies that the manner in which an organisation addresses these areas must be based on the needs and priorities identified through an assessment process involving extensive consultation with workers and their representatives. (Kortum, 2014)

This thesis will focus on the three first areas mentioned above. The Healthy Workplace framework will serve as a general conceptual basis for investigating the role of HSPs and safety climate in organisations. It was not possible to study, with the depth required, the last arena of this framework. Enterprise Community Involvement will be an area beyond the scope of this study.

6.1. Risk management of physical hazards

Risk management of physical hazards is the basis of the OHS management approach. This has been recognised, decades ago, an essential process so that the correct measures are put in place for the success in the prevention of health issues caused or exacerbated by work (Health and Safety Authority, 1999; Garavan, 2002; European Agency for Safety and Health at work - EU-OSHA, n.d.).

According to EU-OSHA (European Agency for Safety and Health at work - EU-OSHA, n.d.) risk management in of work-related hazards involve a five-step approach encompassing:

- Step 1. Identifying hazards and those at risk - Looking for those things at work that have the potential to cause harm, and identifying workers who may be exposed to the hazards;
- Step 2. Evaluating and prioritising risks - Estimating the existing risks (the severity and probability of possible harm) and prioritising them in order of importance;
- Step 3. Deciding on preventive action - Identifying the appropriate measures to eliminate or control the risks;
- Step 4. Taking action - Putting in place the preventive and protective measures through a prioritisation plan;
- Step 5. Monitoring and reviewing - The assessment should be reviewed at regular intervals to ensure that it remains up to date.

Nevertheless, there are several other similar and valid versions of this approach which can be applied according to the type of hazard or complexity of the risk faced and the industry or circumstances it refers to. Additionally, when developing and applying a risk management system, it is important to consider the nature of the workplace (e.g. a fixed establishment, or a transitory one), the type of process (e.g. repeated operations, developing/changing processes, work on demand), the task performed (e.g. repetitive, occasional or high risk) and the technical complexity (European Agency for Safety and Health at work - EU-OSHA, n.d.).

Further to the five-step approach, risk management also should consider the hierarchy of controls when deciding or applying the needed interventions (figure 1.4). This hierarchy recommends that priority should be given to the

control methods at the top of graphic as these are considered to be more effective and protective than those at the bottom.

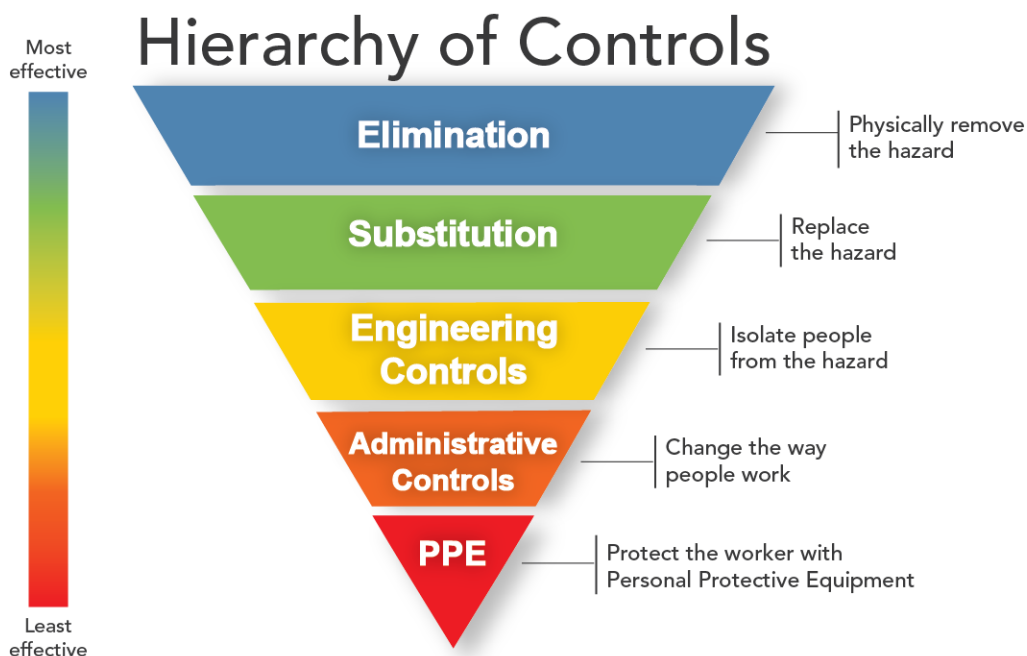


Figure 1.4 – Hierarchy of controls for risk management (Centers for Disease Control and Prevention, 2014)

As recommended by the professional agencies and authorities (Health and Safety Executive, 2011; Centers for Disease Control and Prevention, 2014; Health and Safety Authority, n.d.), the control methods to be considered when implementing risk management measures are:

- **Elimination and Substitution:** If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute a hazard. This generally involves redesigning the job or

substitute a substance/equipment so that the hazard is removed or eliminated.

- **Engineering Controls:** measures which protect workers collectively rather individually as personal protective equipment (PPE). These measures involve redesigning a process to place a barrier between the person and the hazard or remove the hazard from the person, such as machinery guarding, proximity guarding, extraction systems or removing the operator to a remote location away from the hazard. The initial cost of engineering controls can be higher than the cost of administrative controls or PPE, but over the longer term, operating costs are frequently lower, and in some instances, can provide a cost savings in other areas of the process.
- **Administrative Controls and PPE:** These are frequently used when hazards are not particularly well controlled. Administrative controls include adopting standard operating procedures or safe work practices or providing appropriate training, instruction or information to reduce the potential for harm and/or adverse health effects to person(s). PPE is usually seen as the last line of defence and is usually used in conjunction with one or more of the other control measures. Administrative controls and PPE programs may be relatively inexpensive to establish but, over the long term, can be very costly to sustain. These methods for protecting workers have also proven to be less effective than other measures, requiring significant effort by the affected workers.

In Europe, workplace risk management is mainly regulated by the Framework Directive 89/391. Nevertheless, these regulations have been implemented at national level as they were transposed into each country's legislation, introduce the required provisions they see required protect their workers.

6.2. Psychosocial risk management

Psychosocial risk management is among employers' responsibilities as stipulated in the EU Framework Directive on safety and health at work (Directive 89/391/EEC), which obliges employers to manage occupational risks in a preventive manner and to establish health and safety procedures and systems to do so.

The challenge in translating a system for management of psychosocial risks has been widely recognised (Cooper and Cartwright, 1997; Cox *et al.*, 2000; Cox and Griffiths, 2005; Leka and Cox, 2010; vanStolk *et al.*, 2012). However, these authors emphasize that adequate management of psychosocial work risks is essential since workplace health interventions are not enough for addressing the challenges in this area considering they generally do not offer tailored actions nor tackle the root cause of the problem.

Hence, similarly to the management system for physical hazards, literature recommends a systematic approach to manage psychosocial hazards (Cox *et al.*, 2000; Cox and Griffiths, 2005; vanStolk *et al.*, 2012). As previously mentioned, the PRIMA-EF was established, with the support of EU-OSHA and the WHO, in

order to supply guidelines of best practice regarding psychosocial risk management in the workplace (Leka and Cox, 2008).

This framework was developed with consideration for the differences in approach and culture across the diverse EU member-states, so that its implementation is possible across all countries (Leka and Cox, 2008). The PRIMA-EF to be developed and implemented in organisations encompasses, essentially, five main phases:

- Risk Assessment phase: in which hazards, and those at risk, are identified and the level of risk is evaluated in order to establish priorities’;
- Development of an action plan: where a plan for preventative action is drawn (also keeping the hierarchy of controls in mind);
- Risk reduction phase: through the implementation of the action plan designed which should involve both preventative and corrective actions;
- Evaluation phase: in which the actions, interventions and hazards are re-assessed, monitored and reviewed, feeding into the last stage of this process (organisational learning);
- Organisational learning: which promotes the discussion and communication of the results of the evaluation performed in order to share lessons learned and ensure a system of continuous improvement.

As an area which has emerged in recent years, the management of psychosocial risks in European establishments appears to still lag behind the management of general OHS risks (González *et al.*, 2010; European Agency for Safety and Health

at Work (EU-OSHA), 2015). However, progress in this area seems to be positive as establishments with strong management of general OSH risks also appear to manage psychosocial risks better (González *et al.*, 2010).

6.3. Health Promotion

According to the Ottawa Charter for Health Promotion (World Health Organisation, 1986) HP can be understood as the process of enabling people to increase control over, and to improve, their health. In recent years, the WHO recognised the direct impact of the corporate sector on the health of people and on the determinants of health. With this in mind, one of the main commitments within the Bangkok Charter (World Health Organisation, 2005) was to make the promotion of health a requirement for good corporate practice.

Currently, workplace HP seems to have a greater focus on physical health and individual behaviour change. According to data from ESENER-2 (European Agency for Safety and Health at Work (EU-OSHA), 2015) the workplace HP interventions most implemented by EU-28 organisations relate to raising awareness on the prevention of addiction (smoking, alcohol, drugs) (35% of establishments) followed by raising awareness of nutrition (29%) and the promotion of sports activities outside working hours (28%).

Considering the demographic developments in the workforce (e.g. aging population, growth in female working populations, changing in life styles, amongst other) and the changes occurred in the labour market and workplaces, population health issues (public health concerns) have become a big part of the work environment (Zwetsloot *et al.*, 2010). Particularly, since psychosocial risks

have been one of the greatest concerns to tackle in OHS, psychosocial HP has become an essential element of an organisation's HP programme (Leka *et al.*, 2011a; Eurofound and EU-OSHA, 2014).

HP programmes in the workplace are designed to enable workers to cope more effectively with psychosocial risk factors contributing to work-related, personal or family problems that may impact on their wellbeing and work performance, such as stress, violence or the abuse of alcohol and drugs (International Labour Organization (ILO), 2012). Nevertheless, most of these initiatives tackle the problems only from an individual perspective without taking into account the contribution of organisational or labour relations factors. Individual oriented activities usually aim to reduce the effects of poor psychosocial work conditions on workers by improving their ability to adjust and manage those circumstances. These interventions are often included in an Employment Assistance Programme (EAP) which might involve counselling on specific challenges, learning of coping strategies or actions to encourage healthy habits (Vezina *et al.*, 2004). Vezina *et al.* (2004) established an interesting parallel between these type of individual focused measures for psychosocial hazards and the use of personal protective equipment for physical risks: they are secondary prevention measures but insufficient to address the root of the problem.

As stated by the International Labour Organization (ILO) (2012) and Michie and Williams (2003), psychosocial HP interventions still seem to focus mainly on training and education whereas these should also include primary prevention with the view of reducing sources of psychosocial hazards and related health

issues. At the organisational level, psychosocial workplace HP interventions can include the improvement of working conditions, redesigning the workplace, changing work schedules, task restructuring, increase in worker engagement and job control or making environmental changes to the food choice architecture or the exercise environment (Landsbergis, 2003b; Michie and Williams, 2003; Bambra *et al.*, 2007; Egan *et al.*, 2007; Geaney *et al.*, 2013). Additionally, eliminating or reducing work-related factors causing negative health outcomes may involve ergonomic solutions, adjustment of work load, training and more delegation. Clearly defining and negotiating roles can help reduce role-related stress. Improvements in personal relationships and in-work communication can be achieved through interpersonal skills training and rearrangement of physical office layout (Danna and Griffin, 1999).

Research has also shown that worker (and/or their representatives) participation in decision-making is a key psychosocial factor that contributes to a healthy workplace. Participation of workers has been identified as a key success factor for many of the effective physical work environment interventions mentioned above, as well as many of the health promotion interventions (Burton *et al.*, 1999)

The International Labour Organization (ILO) (2012) has described the main characteristics of an effective workplace HP. According to this organisation, a HP programme should:

- 1) Complement OHS measures and be integrated into the OSH management system of the organisation. This way, it contributes in establishing and

maintaining a safe and healthy working environment enhancing the quality of working life and adding to optimal physical and mental health at work.

2) Contribute to enable workers in coping more effectively with psychosocial risks and work-related, personal or family problems that may impact their wellbeing and work performance, such as stress, violence or the abuse of alcohol and drugs.

3) Assist workers in becoming more skilled in managing their chronic conditions and proactive in their health care in order to improve their lifestyles, the quality of their diet and sleep, and their physical fitness.

Although still facing numerous challenges in industry today, HP is generally looked upon favourably by management as these programmes have a role in containing or reducing rising healthcare costs, and increasing productivity at work (Koh, 1995). This area of OHS is important, not only to allow organisations managing the impact of business and work on health, but also to manage the effect of public health and OHS issues on business (Zwetsloot *et al.*, 2010). Amongst the many benefits offered by workplace HP are a stronger psychological health (for instance, stress reduction and better coping, increased job satisfaction and effectiveness, mental health enhancement) and lower levels of sickness absence (Michie and Williams, 2003; Leka *et al.*, 2010; Nielsen *et al.*, 2010; Czabała *et al.*, 2011). Although offering great potential and numerous advantages, workplace HP interventions need to be adequately monitored and assessed regularly with detail and in a systematic manner to achieve optimal results and provide benefits from a business and health perspective (Zwetsloot *et al.*, 2010).

The HSP has much to offer in providing an effective occupational HP programme (Koh, 1995), however, workplace HP is best achieved through the joint action of employers, workers and national authorities. This implies the implementation of an OHS practice which involves the prevention of occupational and other work-related diseases as well as occupational injuries and, the improvement of working conditions and work organization (Baker *et al.*, 1996). Furthermore this requires the incorporation of psychosocial risks into risk-assessment measures and assessing the needs of the organization itself taking into consideration organisational, individual and individual-organisational interaction levels when evaluating workers' health requirements (International Labour Organization (ILO), 2012).

6.4. Safety Climate and the Healthy Workplace Framework

Safety Climate (SC) as a measure of employees' perceptions on the priority of OHS in their organisation forms a central construct to this doctoral study. Safety climate encompasses aspects of the management of both the physical (e.g., maintenance of equipment, use of PPE, amongst others) and psychosocial work environment (management commitment to safety, employee involvement, and communication, work pace and many other factors) (Zohar, 1980; Zohar and Luria, 2005). It is also known that perceptions of SC can affect the way the organisation and its employees interact with equipment, products and other elements of their physical work environment which, in turn, has an impact on safety compliance and safety performance (Zohar, 2008; Christian *et al.*, 2009; Beus *et al.*, 2010). Hence this is one of the links which SC holds with the work

environment (physical and psychosocial) and the health and wellbeing of individuals at work.

Safety Climate is driven by the values and the ethos of management in establishing OHS as a priority in the organisation. As stated by DeJoy *et al.* (2004), this concept reflects the perceptions of employees on the importance of safety in their organisation. SC is also understood as a confirmation on whether the “actions” in the enterprise are in line with the “words” (Shannon and Norman, 2008). Thus, ethics and values are an essential element in the concept of SC as the mentality and ideals shared through the different levels in the company will then drive the practices and behaviours within the organisation - from management, to supervisors and HSPs, to workers; in line with Zohar and Luria (2005) multilevel model of SC (as presented in section 4. Safety Climate - pg. 54).

With this in mind, it is clear that leadership is also a crucial element for the concept of SC. Zohar and Luria (2005) have argued that the relationship between the core meaning of SC and leadership is an inherent and integral one. This has been supported by various studies showing that higher quality relationships between leader and members can lead to higher SC (Barling, 2002; Zohar, 2002; Hofmann, 2003; Clarke and Ward, 2006).

In particular, safety leadership has shown to have an important role in SC. This construct has been defined as “the process of interaction between leaders and followers, through which leaders could exert their influence on followers to achieve organizational safety goals” (Wu *et al.*, 2008). Wu *et al.* (2008) were

able to demonstrate that the more positive the safety leadership perceptions, the more positive is the perceived SC. Various additional studies have also found a link between safety leadership and SC (Kelloway, 2006; Mullen and Kelloway, 2009; Clarke, 2013), which, together with Wu *et al.* (2008) evidenced that CEOs and managers' safety leadership impacts on their commitment and action to SC. The authors also showed that this, ultimately affects safety performance through safety controlling, safety authority, enforcing safety regulation and manipulating safety tactics.

Similar to leadership (and as previously exposed in section 4. Safety Climate – pg. 54) worker involvement is also a pivotal element of SC. Numerous studies have recognised this as one of the main dimensions of SC (Flin *et al.*, 2000; Zohar, 2003; Beus *et al.*, 2010). Furthermore, it has been shown that organisations where worker involvement and participation in safety is maintained seem to have higher levels of safety climate proving the important link between these two concepts.

As a measure of the workforce's perceptions of the true priority of OHS in their organisation, SC will provide a clearer and representative picture of the commitment and efforts that are put in place by the organisation in order to maintain or improve the work environment (be that the physical or psychosocial work environment).

In an environment of stronger SC, it is understood that there are strong efforts to build and maintain supportive and healthy working conditions (physical and psychosocial), a greater priority on OHS and a greater drive and investment on

healthier and safer practices and procedures that promote a safer and healthier workforce.

The relationship between SC and the health and wellbeing of individuals has been evidenced in previous research (Isla Diaz and Diaz Cabrera, 1997; Clarke, 2006b; Beus et al., 2010; Arcury et al., 2012; Murphy 2002). In addition, it is known that SC has a link with the health and wellbeing of individuals, and specifically with accidents and injuries.

Hence, it is understood that, on the one hand SC (with its encouragement toward greater organisational commitment to safety, better safety communication and involvement, among other aspects) might impact on the physical and psychosocial conditions at work which, ultimately, also affects the health and wellbeing of the workforce. On the other hand, a better working environment may also be reflected in a higher SC as a result of more positive perceptions from workers and stakeholders.

It is, therefore, suggested that SC has a central role in the Healthy Workplace Framework. In the context of this thesis the interplay with psychosocial, physical environment and health resources will be investigated.

6.5. The Health and Safety Practitioner and Healthy Workplace Framework

The HSPs have a pivotal role in the OHS of a company as the professional responsible for protecting and promoting the health and wellbeing of the

workforce while also ensuring that no harm is caused or exacerbated by the individuals' job and working environment.

Hence, as previously described in section 3 “The Health and Safety Practitioner” (pg. 36), HSPs are the professionals with a strong and widespread impact on the physical and psychosocial work environment in an organisation while also encouraging the promotion of healthy lifestyles and behaviours within the workplace. The relevance of these professionals to implementation of the healthy workplace framework into practice is, therefore evident.

6.6. The Healthy Workplace Framework in this doctoral research

The WHO framework brings together the principles and common factors which are supported in the literature and in the perceptions of experts and practitioners in the fields of health, safety. This “healthy work organisation” model offers a focused approach to OHS providing several specific ways in which an employer in collaboration with employees can influence the health status of not only the workers but also the organisation as a whole, in terms of its efficiency, productivity and competitiveness (Burton, 2010).

The healthy workplace framework as put forward by the WHO will be the conceptual framework guiding this doctoral thesis, with safety climate and the HSPs as a major OHS agent, integrated in this model, as previously argued. I have, therefore, amplified the healthy workplace framework by including in it the concept of safety climate and the HSPs, as represented in figure 1.5. Although the current piece of work will not explore the area of community engagement it will study with further detail the role of the HSP and Safety

Climate and the relationships between the main components included in this framework (Psychosocial Work Environment; Physical Work Environment; Health Resources) as illustrated in figure 1.5.

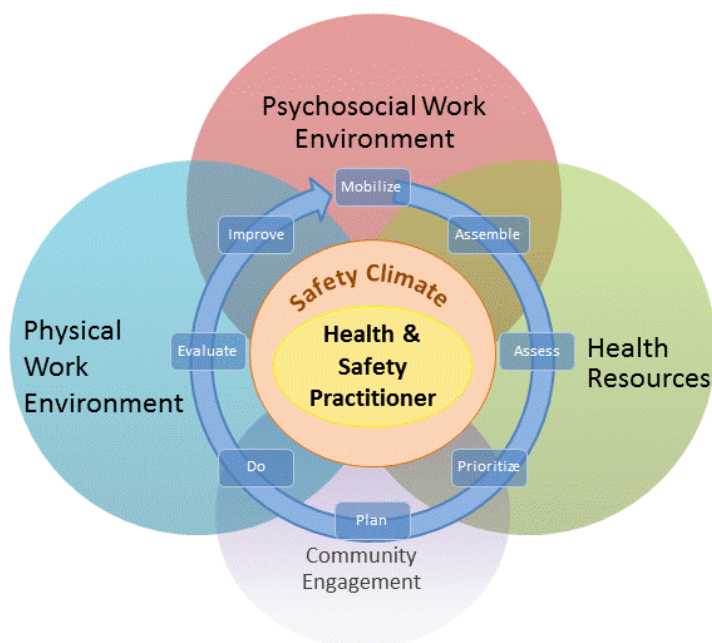


Figure 1.5 – Healthy Workplace Framework applied to this doctoral research.

This will be the theoretical framework guiding this thesis and through which this piece of work will be consolidated. This research is developed from the premise supported by the WHO framework by which optimal OHS results can be achieved when a unified approach is adopted with the interaction, within the organisation, of the four spheres of physical and psychosocial work environment, health resources (and community involvement) and with the inclusion of SC and HSP as pivotal element for a health workplace.

7. The current study: relevance and value

Safety climate has been a central construct to this doctoral study, as a concept closely linked to HSPs and as an influential element for the management of OHS and the health and wellbeing of the workforce. The current study hopes to explore new possible links with SC in the organisations. Although the association of SC with diverse aspects (e.g., safety behaviour, safety performance, amongst others) has been studied, the relationship of this concept with health and safety outcomes in different employment contract groups and with the psychosocial work-related risk is still to be adequately explored.

The research developed in this area has shown that psychosocial and organisational risk factors are those affecting the HSPs the most (Jones, 2005; Hovden *et al.*, 2008; Smith and Wadsworth, 2009). Safety climate, as a measure of employees' perceptions on the priority of OHS in their organisation, has emerged as an important concept for these practitioners' job efficacy (ensuring overall OHS working conditions) but also for their own occupational health and wellbeing. This concept is related to the HSPs at diverse levels: professionally, linked to their work efficacy; or at personal level, in the manner in which it may affect their own health and wellbeing. The current research will study this relationship and the psychosocial risk factors that may affect the HSP, an area in which empirical data is still quite restricted.

From the research available concerning SC, psychosocial OHS and the HSPs a few additional points became clear. In general, little has been investigated within the Irish context in what concerns these areas. Although there is

growing research on the job of HSPs, scholars and practitioners have recognised the great need for further empirical evidence on these practitioners, their role as OHS professionals and the part they play in organisations. With the changes observed in the work environment and the workforce over the past years, it is important that SC remains a concept applicable to the heterogeneity in the current workplace and its personnel. Additionally, from the literature reviewed, health promotion and the management of psychosocial work-related risk factors are also important areas of concern. Although it has been acknowledged that these are two crucial areas for current OHS and for the health and wellbeing of the global labour-force, there is still a dearth of research on these subjects.

With the aforementioned in mind, this doctoral research will expand on the current knowledge available on SC, the HSPs role and psychosocial work-related risk factors as well as health promotion with the potential to open new viewpoints on these areas. The current study will approach these areas, with a rigorous epidemiological design aiming to contribute to a further understanding of these issues (particularly in Ireland and the UK) and inform policy, practice and further research in this field.

7.1. Structure of the Thesis

This thesis was developed to study safety climate (SC), health and safety practitioners (HSP) and work-related psychosocial risks. It is presented in four main papers (one systematic review, and three research articles) as depicted in figure 1.6.

Paper 1 is a systematic review that was performed to inform the research being developed (Chapter 2).

Paper 2: As a result of the candidate's work internship in the health and safety department of a pharmaceutical plant in Ireland, the first empirical study was carried out with data collected through a survey delivered to workers in this company. This study explored the association of SC with accidents and injuries according to the contract type held by those working in the organisation (Chapter 3).

Papers 3 and 4: For the two remaining research articles, data was collected through a web-survey sent to employed HSPs, IOSH members in the UK and Ireland.

Paper 3: The main tasks performed by HSPs were investigated and their involvement studied, particularly, in activities related to the management of psychosocial work-related factors, health promotion and safety culture (Chapter 4).

Paper 4: The last research study included in this piece of work, is an examination of the associations of SC and health climate with psychosocial work factors (job demands-control-support), health and wellbeing and work efficacy of HSPs (Chapter 5).^a

^a For publication, the possibility of dividing this article into two separate publications is being considered bearing in mind the extensive amount of data provided in this research study. Currently this option is being discussed with the journal editors.

7.2. Aims and Objectives

The current doctoral study set out to obtain a deeper understanding on the practice and management of Occupational Health and Safety, particularly in Ireland and the UK. This work focuses on safety climate and its relationship with occupational health and safety outcomes and with characteristics of work and organisations to understand its role in the management of Occupational Health and Safety. This thesis also endeavours to strengthen the body of knowledge regarding health and safety practitioners, their role in the organisation and their work characteristics. Additionally, the current research aims to contribute to the development of future guidelines and advice for the implementation of the Healthy Workplace Framework in organisations. This study also intends to inform education needs for health and safety practitioners in order to provide recommendations for training and continuous professional development for these practitioners.

The specific objectives of this thesis are:

- Investigate the role of safety climate in the workplace environment and in the management of current (and contemporary) occupational health and safety challenges by determining its associations with health and safety outcomes and by comparing contingent and permanent workers;

H₁: Safety climate is positively associated with general health, mental wellbeing and safety outcomes.

H_{1a}: Safety climate's association with general health, mental wellbeing and safety outcomes will be stronger for permanent than contingent workers.

- Examine the management of occupational health and safety in Ireland and the UK within industry, according to the recommendations established by the World Health Organisation's healthy workplace framework with a focus on the management of psychosocial workplace risks, health promotion, safety climate;

H₂: There is poor implementation of measures for management of psychosocial workplace risk factors in Ireland and the UK.

H₃: There is poor incorporation of health promotion in the general management of occupational health and safety in Ireland and the UK.

H₄: There is poor incorporation of safety climate in the general management of occupational health and safety in Ireland and the UK.

- Analyse the role of the health and safety practitioners and of safety climate in the World Health Organisation's healthy workplace framework by examining their links with the physical and psychosocial work environment and health promotion;

H₅: Health and safety practitioners are generally more engaged in tasks related to the psychosocial work environment than the psychosocial work environment or health promotion.

H₆: Higher work efficacy for health and safety practitioners is linked to better psychosocial working conditions.

H₇: a) Safety climate is associated with better physical work environments (specifically with less accidents and injuries);

- b)** Safety climate is associated with better psychosocial work environments;
- c)** Safety climate is associated with better health and mental wellbeing;
- Investigate the role of health and safety practitioners in their organisations - determining some of the main challenges faced by these professionals - and analyse safety climate and psychosocial working conditions as determinants for the health, wellbeing and effective work of these professionals.

Paper 1 and Paper 2

- (Paper 1) Systematically synthesise and critically discuss, current available empirical data by analysing, with further detail, the potential impact of organisational safety climate on the level of occupational accident and injury in industrial organisations while taking an epidemiological perspective;
- (Paper 2) Examine differences in the safety climate perceptions among permanent and contingent workers and the group-specific associations of SC to accidents and injuries in an organisation.

Paper 3

- Investigate the tasks of a large representative sample of HSPs from diverse industries in Ireland and the UK, and specifically determine these professionals' involvement in activities to prevent and tackle Psychosocial work-related risks, manage the Safety Culture and plan and implement Health Promotion within their organisations;
- Determine the organisational predictors for the engagement of HSPs in psychosocial, health promotion and safety culture activities;

Paper 4

- Examine the association of safety climate and health climate with the health, wellbeing and efficacy of HSPs;
- Analyse the association of psychosocial workplace factors and the health, wellbeing and efficacy of HSPs;
- Investigate the possible mediating effect of psychosocial workplace factors in the association of SC and HC with the general health and efficacy of HSPs;

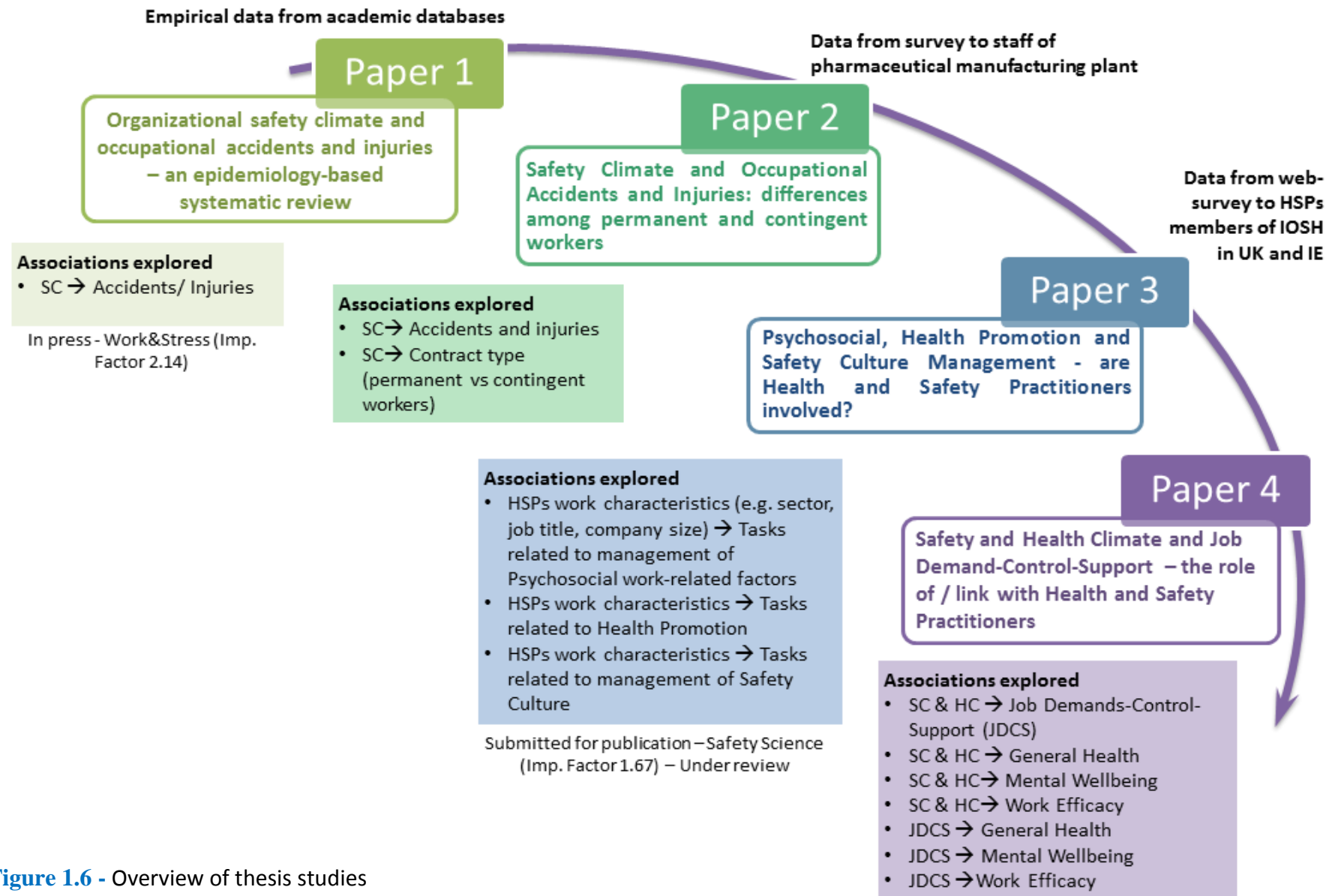


Figure 1.6 - Overview of thesis studies

Chapter 2 – Paper 1: Organisational safety climate and occupational accidents and injuries in industry - an epidemiology-based systematic review

Published;

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Organisational safety climate and occupational accidents and injuries in industry - an epidemiology-based systematic review

Abstract

It is widely accepted among practitioners and researchers that a good safety climate results in improved safety. However, there is a lack of systematic and detailed reviews summarising and evaluating the scientific evidence underpinning the accepted relationship between safety climate and injuries and accidents in a company. The current research aims to address this gap and study the association of safety climate with accidents and injury at work. Nine databases were searched for quantitative studies (in 3 languages). After eligibility and quality selection, 17 peer-reviewed papers were analysed. Quality assessment was developed applying the STROBE guidelines together with 9 appraisal criteria from Berra and colleagues (2008), Downs and Black (1998) and the appraisal tool from University of Cardiff (Weightman *et al.*, 2004). An evaluation summary statement was then constructed analysing the strength of the evidence provided by each study. Although 15 of the 17 studies included in this review provided support (or partial support) on the association of safety climate with accidents/injuries at work, scientific evidence is still unclear on the causal relationship between these two variables. Research is needed, especially longitudinal and intervention studies, to demonstrate in detail this association which has been widely accepted in the area of Occupational Health and Safety.

Keywords: Safety Climate; Work Accidents; Work Injuries; Organisational Dimensions

1. Introduction

Diverse factors influence occupational accident and injury rates. It is commonly accepted, among health and safety practitioners that safety climate plays an important role in these and that companies with higher levels of safety climate might present lower accidents and/or injury rates. Safety climate has become a “leading indicator” of safety performance (Flin *et al.*, 2000) since research has revealed growing evidence that safety climate is associated with safety practices (Zohar, 1980), accidents (Mearns *et al.*, 1998), and safe behaviour (Hofmann and Stetzer, 1996; Cabrera and Isla, 1998; Tomas *et al.*, 1999; Brown *et al.*, 2000). While the association between safety climate and accidents and injuries is intriguing, scientific evidence is difficult to interpret as several conceptual and methodological issues surround this debate.

Firstly, there is ambiguity around the concept of safety climate versus safety culture causing confusion and lack of distinction between the two constructs. As noted by Zohar (2003), some scholars and practitioners use these constructs interchangeably creating a difficulty in the interpretation of the literature. Safety culture is generally understood as the aspects of the organisational culture, values, attitudes and beliefs which will impact on attitudes and behaviours related to increasing or decreasing risk at work (Guldenmund, 2000; Seo *et al.*, 2004). In what concerns safety climate, Zohar (1980) was the first author providing a comprehensive definition for this construct as “a summary of molar perceptions that employees share about their work environments”. Safety climate is often regarded as a manifestation of safety culture in the behaviour and expressed attitude of employees (Reichers and

Schneider, 1990). Throughout the numerous research in this field, there is no agreed definition of safety climate. However, it is generally accepted that it represents employee shared perceptions of the priority an organisation places on safety, as more recently defined by Zohar and Luria (2004).

Secondly, there is the challenge regarding the measurement level of safety climate. On his first presentation of safety climate, Zohar (1980) referred to two measurement levels for this construct: the company/organisational level (related to perceptions regarding the policies in the company and general management attitude towards safety) and the group level (concerning perceptions of practices within departments in each organisation or the supervisory approach to safety). Initially Zohar (1980; 2003) conceptualised safety climate as a social construct characterizing groups of people and not focusing on the person's individual perceptions. However, from examination of the statistical analysis in numerous studies, safety climate is treated as an individual level concept, and the perceptions of individuals are analysed without reference to team, group or organisational level.

Hence, generally, in research, the concept of safety climate has been measured or analysed at three different levels: at company level with aggregation of data obtained from individuals within one company, at group level with aggregation of data by department or supervision unit, and at individual level without aggregation of data. Multi-level modelling has emerged as one of the main strategies to account for the hierarchical structure of this concept as mentioned by Zohar and Luria (2005; 2008). A meta-analysis on the comparison of person-related and situation-related determinants of workplace safety conducted by

Christian and colleagues (2009) demonstrated the high frequency in which safety climate has been analysed at individual level. The authors argued for a construct of “Psychological Safety Climate” defined as individual perceptions of safety-related policies, practices and procedures pertaining to safety matters that affect personal wellbeing at work. Conversely, group-level safety climate would be understood as perceptions shared among individuals in a particular work environment resulting from patterns of behaviours and practices (Christian *et al.*, 2009).

Thirdly, there is no clear agreement on safety climate’s dimensions, which may be partly caused by the differences between occupational sectors, the diversity in management style and safety policies across companies (Vinodkumar and Bhasi, 2009). In fact, Coyle *et al.* (1995) in their study on safety climate (SC) factors in service organisations, argued that a universal stability of the dimensions or factors of this concept across organisation is not possible. Zohar (2003) suggested that measures of SC should only include organisational dimensions, particularly “features indicative of management commitment” – organisational safety climate. Beus *et al.* (2010) observed, in fact, that the use of dimensions that deviate from Zohar’s view of SC can act as “contaminants”, skewing the associations with this concept and affecting the clear understanding of safety climate.

Problematically, the measurement of safety climate sometimes includes a mixture of organisational factors (such as management commitment to safety, safety systems and job risk) and person-related factors (such as attitudes and safety motivation) as well as behavioural factors (such as safety behaviour or

compliance) without clear differentiation (Cox and Cox, 1991; Hofmann and Stetzer, 1996; Williamson *et al.*, 1997; Mearns *et al.*, 1998; Cox and Cheyne, 2000; Mearns *et al.*, 2003; Siu *et al.*, 2004; Clarke, 2006c). Nonetheless, through the work of Seo and colleagues (2004), Flin and colleagues (2000), Beus and colleagues (2010) and Zohar (2003) five main organisational factors appear to be the most relevant (and commonly used) for assessment of safety climate: Management Safety Priority and Commitment; Safety Management and Procedures and Policies; Safety Communication; Safety Training; Work Risk and Employee Involvement in Safety. However, throughout research, diverse authors have introduced different dimensions in this concept, some even person-related as mentioned above. Convention has, thus diverged from the original view Zohar (1980; 2003) held on safety climate.

Finally, the role of confounding factors in safety climate associations is not clear, potentially creating a spurious relationship or suppressing an association between safety climate and accidents and injuries. For example, studies rarely control for differences in industry hazards as pointed out by Smith *et al.* (2006a). Adjustment for this factor may be particularly important when conducting studies across different industries with wide variation in levels of work hazards and related accident and injury rates. Interestingly in a study on the relationship between safety climate and injury rates across 33 companies from different industries, these researchers found significant associations between company-level safety climate measures and three indicators of injury claims rates. However, all of the above associations collapsed when controlling for the inherent hazardous nature of the specific industry. Other confounders

may include gender, age, job experience and education (de Jonge *et al.*, 1999; Jin *et al.*, 2004; Law *et al.*, 2011; Farrow and Reynolds, 2012).

1.1. Previous reviews on safety climate and accidents/injuries

Previous systematic reviews on safety climate and safety performance summarised the evidence on the relationship between safety climate and accidents and injuries, each of them, with a different emphasis. The meta-analyses conducted by Clarke (2006b, 2010) provided insights into the specific mechanisms by which safety climate potentially impacts on safety performance and accident/injury rates. Clarke (2006b) postulated that a favourable organisational safety climate would be associated with positive safety behaviours, such as good safety participation and compliance (safety performance) leading to low accident and injury rates. Although the meta-analysis found evidence for an association between safety climate and safety behaviours, the subsequent associations between safety behaviours and accidents were weak. In another meta-analytical approach, Clarke (2010) tested an integrative model of safety climate and found that the relationship between this concept and occupational accidents was partially mediated by safety behaviours but also by general health of the individual workers. In these reviews, safety climate was treated as a one-dimensional concept (contrary to the classification taken in the current review) and did not investigate specific associations between dimensions of safety climate and behavioural and injury outcomes. Furthermore, the potential for causation in the associations reported in these reviews was not analysed.

In their systematic review, Christian *et al.* (2009) introduced a useful differentiation between person-related antecedents of work safety (such as personality and attitude) in contrast to situation-related antecedents (safety climate at individual and at group level and leadership) and investigated their link to safety motivation and safety knowledge. These were then subsequently associated to safety performance (behaviours related to compliance and participation) and to safety outcomes (accidents and injuries). While the person-related factors were more strongly associated with safety performance, safety climate showed associations to accidents and injuries with the strongest relationships recorded at group level. The overall safety climate measure as well as four of the six dimensions used (management commitment, human resources management practice, safety systems and work pressure), were moderately associated with accidents/injuries.

Beus *et al.* (2010), also used these two distinct safety climate levels (group and individual level) in their meta-analyses on the influence of this concept on injuries and on the possibility of reverse association. The authors found, not only that SC can be a predictor of injuries, but also that group SC showed a stronger effect on injuries than individual SC. Although Beus *et al.* (2010) gave closer attention to the content and possible contamination of the measurement of safety climate, they did not take the possible contamination of data by bias or confounding into account.

1.2. Aims and objectives of the review

The aim of this review is to build on the previous work presented by Clarke (2006b; a), Christian *et al.* (2009) and Beus *et al.* (2010), by analysing, with

further detail, the potential impact of organisational safety climate on the level of occupational accident and injury in industrial organisations. As the impact of safety climate can vary by sector (Clarke, 2006b; Beus *et al.*, 2010), the present review will focus solely on an industrial setting. Following the differentiation made by Christian *et al.* (2009) between person-related and situation-related antecedents of workplace safety, the present review will focus on the situation-related precursors. Hence, it is understood that safety climate, as an antecedent of safety, will be centred on factors related to the organisation and work environment - organisational safety climate – rather than on elements related to the workers' personality, attitudes or behaviours.

Organisational factors of safety climate will, thus, be clearly differentiated from person-related factors. Special attention will be given to the different dimensions of this concept and the specific associations between each dimension and accidents/injuries, as this issue has not been discussed in depth in previous reviews. This will give insight into the SC specific components most consistently linked with accidents or injuries at work.

For the purpose of this systematic review, “organisational safety climate” will be understood as the perceptions of individuals regarding their company's safety policies, procedures and practices. This implies that organisational factors are crucial for workers' perceptions of safety climate. Hence, this should be a measure of worker perceptions regarding the value of safety in the organisation. Although we believe that person-related dimensions, as well as compliance and behaviour factors, should not be considered an integral part of this concept, numerous studies have included these in their measurement of SC.

While following the model of Christian *et al.* (2009) for conceptualisation of SC, studies which contained both organisational dimensions and person-related or behaviour factors will also be included, for the purpose of comparison and in order to explore the different types of safety climate measurements.

In this review, SC will also be considered as a multidimensional construct. Hence, safety climate should not be represented by measurement of one single dimension (i.e. one cannot measure safety climate by the score obtained for a particular dimension only, for example, “management commitment” or “work pressure”). Additionally, although an overall score can be obtained for this concept, this should be achieved through a sound measurement of each dimension and their contribution or weighing towards this score. Hence, a theoretical and statistical test foundation becomes essential to avoid a possible arbitrary selection of dimensions and ensure a coherent and consistent measurement of safety climate.

We also consider safety climate as a concept which holds multilevel relationships in the organisations as previously presented by Zohar (Zohar 2003, 2008; Zohar and Luria, 2005). This implies that processes which take place at one hierarchical level have an impact on other levels in the company. To account for the different levels, this review will compare the evidence provided by studies with individual-level analyses compared to group/company-level analyses in explaining accidents and injuries.

The review also specifically focuses on potential biases and confounders, for example hazardous level or nature of the job, hereby following the discussion introduced by Smith *et al.* (2006). An epidemiological perspective will be used,

specifically addressing confounding and biases that may have affected the results. This investigation may also generate evidence that supports or does not support often assumed causation between safety climate and safety performance measures. Detailed quality assessments of the reviewed studies are done following a stringent evidence-based paradigm by critically appraising the methodological and conceptual strength of the evidence. This will allow assessing the evidence gathered, assigning a stronger weight to studies with higher quality scores.

Considering the aforementioned, the following questions will guide the review:

Q1 – What are the organisational and person-related dimensions most commonly used for the measurement of safety climate in studies investigating its association with accidents and injuries?

Q2 – Which dimensions of safety climate present the strongest associations with accidents or injuries at work?

Q3 – Is there a difference between organisational and person-related safety climate dimensions in their relationship with accidents or injuries?

Furthermore, it becomes important to understand how the study design and external factors might interfere with the relationship safety climate – accidents/injuries. For instance, elements such as age, seniority in the company, level of risk of work, previous experienced accident and training might influence the link evidenced in some of the studies. Therefore, the following question is also raised:

Q4 – What are the main confounders and biases identified in the research, affecting the association safety climate –accidents/injuries? How do they impact on the link between these variables and can causation be assumed?

2. Methods

2.1. Inclusion and exclusion criteria

All studies using quantitative research methods investigating the association between organisational safety climate and occupational accidents or injuries were eligible for inclusion independent of their study design type. Papers were included only if they applied a multidimensional measure of safety climate, addressing at least one organisational aspect of this concept such as management commitment, supervisor/management safety practices, priority for safety over production, communication, management values, safety training/education among many others. Studies with a pure individual safety climate concept measured solely by safety compliance or health & safety behaviour were excluded. Studies were eligible for inclusion when they either used self-reported injury and accident measures or company statistics on injury and accident rates. The literature search was limited to articles published in peer-reviewed journals in English, Spanish or Portuguese language without limitation by publication date. The study population was restricted to industrial settings, other sectors, for example health care or education, were excluded.^b

^b Further details on inclusion and exclusion criteria for this paper are available on this thesis Appendix 2

2.2. Literature search

Nine databases were searched from their inception up to March 2012: EBSCO (including: CINAHL/Medline; Soc Index; Psychology and Behavioural Sciences Collection; PsychInfo; PsycArticle), ScienceDirect , PubMed, JSTOR. Google Scholar, NIOSHTIC-2, CIS, CCOHS and Cochrane Reviews.

The main search terms were “Safety Climate”, “Safety Culture”, “Accidents”, “Injury” (in Portuguese and Spanish “Clima de seguranca”, “Acidentes”, “Cultura de seguranca”) or their combination with the application of the Boolean search terms (AND; OR; NOT). Other search terms were also explored (such as ‘Safety Performance’, ‘Safety Officer’, among others) but these did not yield additional results.

The references in all relevant papers were hand-searched in order to identify any further relevant references. Paper and online versions were eligible for inclusion.

From the identified articles, titles and abstracts were scanned for primary selection. Duplicates were removed and only then a further and more detailed analysis was done to determine whether the study satisfied the stated inclusion criteria for the review.^c

^c Further details on the search strategies used on this paper are available on this thesis’ Appendix 3

2.3. Data extraction

Data extraction was carried out after the primary selection of studies, and retrieval of the full text of the relevant papers. Information relating to Sample Size, Setting, Inclusion/Exclusion, Criteria, Study-Type, Duration, Independent Variables, Dependent Variables, Method of Analysis was abstracted from each study.

2.4. Quality assessment

The quality of the eligible publications was assessed by application of the “checklist of items to include in reports of observational studies”, a tool developed by the Strengthening the Reporting of Observational Studies (STROBE) Initiative (Vandenbroucke *et al.*, 2007). Additionally, due to the lack of a universal tool for the systematic assessment of cross-sectional studies, nine criteria were applied in order to assess the main quality aspects of the selected publications. These criteria were adapted from the widely used instrument by Downs and Black (1998) (3 items), the quality appraisal checklist by Berra and colleagues (2008) (3 items), and the new cross-sectional quality assessment tool developed by the University of Cardiff for Observational Studies (Weightman *et al.*, 2004) (3 items). The STROBE guidelines (Vandenbroucke *et al.*, 2007) were also followed for this procedure.

The items addressed both the theoretical and the methodological quality of the paper. The following items were included in this quality appraisal tool: *Was the sample representative of its target population; Did the study achieve a good response rate; Were the main variables properly defined conceptually and*

operationally; Do the measurement tools of the main variables have proper validity and reliability; Were rigorous processes used to develop the questions; Was data collection carried out through more than one process; Were the statistical tests used to assess the main outcomes appropriate; Was there adequate adjustment for confounding in the analyses from which the main findings were drawn; Are the results relevant locally. Further detail on these items and their practical considerations can be found in Downs and Black (1998) and Vandenbroucke *et al.* (2007).

A judgement was then developed detailing the strengths and limitations of the papers at both methodological and theoretical level. The results of the quality appraisal were not a determining criterion for the inclusion or exclusion of studies (hence, articles were not excluded if they presented a lower quality level), however, this allowed weighing the evidence yielded by these studies.

2.5. Data synthesis

The main information and findings for each study were gathered and a summary statement was, then, developed. Due to the heterogeneity of methodologies and analyses in the studies included, a narrative systematic review was developed and meta-analysis was not conducted. The narrative style through “best-evidence synthesis” (Slavin, 1995) has shown to be the most beneficial to the present work, allowing the analysis of each study in detail, establishing comparisons (e.g. group vs. individual analysis level, organisational vs. person-related factors) and observing possible patterns.

Evidence from each study was interpreted according to the quality of its data and the support it provided towards the association between SC and accidents/injuries. In studies where more than one type of statistical test was performed (e.g. correlations and regression modelling; mediated and non-mediated models) and divergent or conflicting results were obtained, the evidence was classified as providing “partial support” to the assumptions being explored. Similarly, in cases where SC (as one concept) did not show an association with the outcomes but one (or more) of its specific dimensions yielded significant associations, the evidence was deemed as providing “partial support” towards this relationship.

3. Results

3.1. Search outcomes

A total of 17 studies were found to be eligible for inclusion into the review as they satisfied the stated inclusion criteria. From the literature search carried out in the nine databases, 609 publications emerged as possibly relevant. After removing duplicates a total of 418 papers were then scanned on the title and abstract to analyse their eligibility, leading to a selection of 71 possibly eligible studies. After reviewing these, 40 publications were excluded because they did not address the association of safety climate with accidents and/or occupational injury. A further 14 publications were eliminated since they analysed only person-related or behavioural factors of safety climate, not studying the

association between organisational dimensions or management aspects with accident/injury.^d

3.2. Characteristics of publications included

Of the 17 included studies, 15 (88.2%) had a cross-sectional design. There were, however, two exceptions with paper 10 presenting a quasi-experimental design and paper 16 a longitudinal design.

As can be seen in Table 2.1, the included studies were conducted in a variety of countries and encompassed a range of industries (e.g. oil industry, construction and manufacturing) as well as diverse company sizes. Most studies sampled production workers. Five of the publications included participants from diverse levels across the organisations including team leaders, supervisors and managers (1, 8, 14-17). There was an equal number of studies with data gathered through self-reporting methods for the dependent variable (1-7, 14, 15, 17), and with use of recorded statistics (8-13, 16).

Diverse tools were applied for the measurement of safety climate (independent variable). Eleven studies used previously validated instruments, such as the Danish Safety Culture Questionnaire (Nielsen and Mikkelsen, 2007); Zohar Safety Climate Survey (Zohar and Luria, 2005), the Offshore Safety Questionnaire (Rundmo (1994) and Rhona Flin *et al.* (1996)), Deboddeller and Beland's questionnaire (1991) and the 16 item tool by Neal *et al.* (2000). The

^d The flow diagram regarding the selection of publications in this systematic review is available on this thesis' Appendix 4

remaining six publications (3, 5, 10, 12, 13, 17) employed instruments created by the authors.

Correlation was used in 12 studies for the analysis of the association between safety climate and accidents and/or injuries, (1, 3, 5-7, 9, 12-17), regression modelling was applied in 5 papers (2, 4, 8, 11, 15) and other analysis methods included ANOVA, t-test and Structural Equation Modelling, among others.

Seven of the publications (1-7) presented an analysis at individual level, seven further papers analysed safety climate at group level (8-14) and three publications developed both types of analysis (15-17). Five of the ten papers with group level analyses or with analyses at both levels yielded supporting findings (8, 12-14, 17). Three additional studies presented relevant results but only partially substantiating the association (9-11). In contrast, only two of the seven papers with analysis at individual level presented supporting evidence for this relationship with a moderate association (4, 5) considering that paper 2, 3, 6 and 7 only showed a weak relationship between the variables.

Safety Climate dimensions applied in studies (Q1, Q2 and Q3)

The most commonly used dimensions for measurement of SC in the studies were those related to management commitment (applied in 12 of the 17 studies). Other regularly used organisational dimensions related to involvement in safety (used in 6 papers), safety communication and safety training (each was applied in five papers). Further less commonly used organisational dimensions (or general themes to which they relate) included “safety management” (company’s policies, systems, procedures and safety measures), “supervisory practices and competence” and “priority of safety over production”.

A total of four person-related dimensions were identified in the papers reviewed. “Workers response to safety” was the person-related dimension most widely applied (used in a total of five studies). “Safety attitudes” was used in three papers and the dimensions “co-worker safety practices” and “unsafe behaviour” were found in two studies. (Q1)

A higher percentage of the studies using solely organisational dimensions was able to provide evidence on the link of SC with accidents or injuries (100%) than those including person-related dimensions (44.4%). Of those eight papers which include solely organisational dimensions in their SC measures, three showed evidence on the association between SC and Accidents/Injuries and five provided partial support to this. Diverse organisational dimensions showed significant links with accidents and injuries with examples such as “involvement” (16), “priority of safety over production” and “management commitment and actions for safety” (17) presenting a strong and significant association with these outcomes. (Q2)

Of the 17 studies reviewed, nine included at least one person-related dimension in their measurement of SC (1, 4, 6, 8, 10, 12, 15-17). Four of these provided evidence on the association of this concept with accidents/injuries and three yielded partial support to this relationship. Five person-related dimensions were included across the studies, however only three provided significant links with accidents or injuries: “safety attitudes” yielded a weak association with accidents or injuries, “workers’ participation and commitment to safety” as well as “workers’ knowledge and compliance to safety” (17) presented a moderate relationship with accidents or injuries. Hence, organisational dimensions seem

to have yielded stronger and more significant associations than person-related dimensions. (Q3)

The association of safety climate with accidents or injuries taking study design, bias and confounding into account (Q4)

Of the 17 studies reviewed, 15 showed support or partial support to the association between safety climate and accident/injury rates. Only two papers (1, 16) were not able to present sufficient evidence to back this link.

The relationship of safety climate with accidents was demonstrated by eight studies: 4, 7, 12-17. Additionally, eight studies (2, 3, 5, 6, 8-11), showed a significant association between safety climate and injuries.

As a first step in establishing causation in the relationships found, we looked closer into the strength of associations presented.

Table 2.2 presents a summary of the results of the seven studies with individual level analyses. Significant associations between accidents and safety climate were found in 3 of these publications (2, 3 and 5) presenting, albeit, a very weak relationship. Similarly, study 6 reported a weak association between safety attitudes (composed of four of the safety climate factors) and accident rates ($r = -.16$; $p < .05$). Paper 4 was able to demonstrate a moderate association of safety climate dimensions and level of fatalities at work.

Paper 7 provided partial support to the relationship as it did not demonstrate significant associations at the first stages of analysis but showed to be a mediator in the partial mediation test.

The results of the studies applying group level analyses are summarised in Table 2.3. Of these seven papers, four showed supporting evidence of the relationship under study. Paper 14 presented the strongest association between safety climate and the outcome ($r = .66$, $p < .01$). Study 8 evidenced a moderate association of safety climate with injury rate ($\beta = 0.57$, $p < .001$) whereas paper 13 showed a weak relationship with this concept ($r = -.26$; $p < .05$). Study 12 showed strong relationships but only between the particular SC dimensions and accident rates. Considering temporality is an important element when establishing causation, the quasi-experimental study (10) presented greater potential to yield stronger evidence on a causal relationship. This paper compared two different plants within the same corporation: one where a work environment intervention had been applied preceding the study (control plant) and a second one where such an intervention was being applied during the study (study plant). Safety climate and accident rates as well as self-reported injury were measured at two different periods (with an interval of 12 months) in both plants. A linear trend was noticed in the reduction of self-reported injuries in both plants (more accentuated in the study plant) leading to a convergence of these values for both plants. Nevertheless, the findings did not support a significant association between safety climate and accidents nor injuries.

The studies with analysis at both individual and group level (Table 2.4), may supply essential insights into the nature of safety climate as an individual or group level concept. Thus, it is of interest to give closer attention to these results. Of these studies, only paper 17 showed a strong and significant

association between the two variables. This relationship was not only evident in the bivariate correlation but also in the ANOVA model adjusting for company's level of accident rate (high/low) and workers accident history. In paper 16 the relationships found, at both levels, between SC scores and the outcome were not significant. However, in study 15 it was possible to associate safety climate dimensions to accidents in the unadjusted model (only "Safety Goals and Standards" presented a significant association in the adjusted model).

We further explored whether associations in the included papers were controlled for potential confounders. Only six studies took possible confounders into account (2, 5, 7, 11, 13, 15). The following confounders were found across these papers: shift, department, age, height of fall, surface where landed, industry specific hazard, tenure, group size, level of risk of work and workplace environment. It was also noticed that only 6 papers used reported data for their outcome variable (rather than self-reported measures).

3.3. Quality assessment

The quality assessment showed the particular strengths and limitations of the individual publications in relation to methods and theory. Three papers showed higher strength at theoretical level (1, 4, 17) and only one seemed to present a strong level methodologically (13). In contrast, two studies presented limitations at both theory and methodology level (8, 16).

Overall the research quality of the reviewed papers was rated as low to moderate. Through the appraisal process, study 2 was rated highest and showed strength at both theoretical and methodological level. Very few papers

held a high methodological strength demonstrating that evidence provided on the association between safety climate and accidents/injuries still presents quality limitations.

Generally, the samples used in each study were relatively representative of their respective target population. However, only 62% of studies showed substantial response rate (average = 65.2%) and confounders were only considered in 37.5% of the papers (2, 5, 7, 11, 13, 15). Additionally, data was collected through more than self-reporting (preventing common-method and/or recall bias) in just 37.5% of the publications (papers 9-13 and 16).

Based on the quality assessment, studies 2, 10, 13 and 15 seem to present the highest quality at theoretical and/or methodological level. These papers supplied partial support to the association being explored considering the, although significant, weak relationship demonstrated between safety climate and accident/injury.

All the aforementioned aspects are indicative of the somewhat uninformative nature of previous research in this area and, hence, pose a challenge in drawing clear conclusions on the association of safety climate with accidents/injuries.

Further detail on the quality appraisal of each paper can be found in Table 2.5 and 2.6 (available on request or online- Appendix 6 in thesis).

4. Discussion

Fifteen of the 17 studies included in this review provided evidence of an association between safety climate and injury or accidents with only two publications showing no support for this relationship. Of these 15 papers, 8

partially supported this association with only 7 studies presenting evidence fully supporting the relationship under study. The studies reviewed, adopted a variety of safety climate measurement tools which made it difficult to compare the findings.

Interestingly, studies with group level analysis of safety climate or analyses at group and individual level provided stronger evidence for an association between safety climate and accident or injury. These results seem to be in line with Zohar's (1980) views on safety climate as a social construct to be measured within groups of people sharing a common element (company, department, supervisor) (Zohar, 1980). Similar views were also presented by Beus and colleagues (2010). People's shared perceptions may, indeed, play a significant role in the assessment of safety climate which might show stronger and more reliable results when analysed within clusters of people. However, the evidence from studies with group-level analyses must be interpreted with caution, considering the overall small sample size they present. Since these studies measured SC at a company or plant level, the sample size becomes the amount of these units which was included in their analysis (in these articles, ranged from 8 to 33 organisations). Notwithstanding, these are still interesting results which could also suggest that prevention plans and interventions should focus more on groups of workers rather than each individual, since their shared perceptions seem to have a stronger link with safety outcomes.

Safety Climate dimensions applied and their relationship with accidents and injuries (Q1, Q2 and Q3)

“Management commitment, values or concern to safety”, “training”, “safety communication” and “involvement in safety” were the most widely used safety climate dimensions across the included studies. (Q1)

From the results provided by study 4 and 12, particular dimensions emerged as relevant predictors of the levels of occupational accidents or injuries: “Management Safety Practices” and “Safety Training” were associated with a reduction of fatalities; “Organisation Responsibility”, “Safety Goals and Standards”, “Safety Management” and “Safety Communication” were associated with a reduction of accidents among others. (Q2)

The higher proportion of organisational SC measures providing evidence on the relationship with accidents and/or injuries, together with the significant association found between the latter and diverse organisation-related dimensions suggests that organisational factors have high relevance, not only in the measurement of SC but also in the prevention of accidents and injuries. This is consistent with Zohar’s (2003) and Griffin and Neal’s (2000) view in which safety climate is measured exclusively through organisational dimensions considering person-related factors as independent safety variables which, although with implications for health and safety, are not components of SC. (Q3)

The current findings are also supported by Beus and colleagues (2010) who showed that organisational-related SC dimensions have stronger effects in the prediction of injuries at work.

Research has already argued that although individuals might perform the act leading to accidents, often they are not the ones responsible for their

occurrence (Brown *et al.*, 2000). These findings support this premise illustrating the relevance of organisational commitment, policies and practices to the level of accidents and injuries at work. With this in mind, one could argue that a greater commitment to organisational safety climate in a company may lead to a reduction of accidents or injuries in the workplace.

It is also interesting to notice the relationship between safety climate and injuries as evidenced in paper 9. This concept showed to be a predictor of injuries when mediated by safety behaviour. It is plausible that the accidents and incidents in a company, although highly influenced by organisational safety climate are also closely linked to safety behaviour, considering individuals will be the ones ultimately performing the actions that may lead to an incident or a safe outcome. Therefore, this association demonstrates how, although the organisational structure has a pivotal role, one should not discard the relevance of the individual's behaviour to the occurrence of accident and injuries as previously observed by Clarke (2006a), Zohar (2003) and Christian *et al.* (2009). On the other hand, it is also essential to reflect on how safety behaviour is influenced by organisational safety climate and how these concepts seem to have a synergetic relationship fuelling each other.

Paper 7 also shows relevant findings evidencing the role of safety climate as a mediator in the relationship of high-performance work systems with incidents (accidents and near-misses). It is intriguing to notice how safety climate has an influence on the association between accidents and work systems characterised by higher management commitment, involvement of all levels within the company and (at times) empowerment of the workforce. This seems to indicate,

once more, the importance of organisational measures (engaging management at all levels and encouraging participation of stakeholders in the agenda of safety), to safety performance and ultimately accidents and injuries at work as previously argued in this review.

The association of safety climate with accidents or injuries taking study design, confounding and bias into account (Q4)

Considering safety climate's link with safe behaviour, it is expected that an environment with strong safety climate is linked to fewer injuries and accidents. On the other hand, arguments towards the impact of accident/injury rates on safety climate have also been put forward. These suggest that the number of incidents in an organisation might inform about its safety levels and also affect the perceptions of individuals regarding safety practices and procedures in their workplace (Zohar, 2003; Beus *et al.*, 2010). Additionally, other views proclaim that workers who experienced accidents or injuries might have a less favourable perception of their workplace's safety climate and perceive poorer safety practices in the organisation. This may, consequently, influence their safety behaviour completing the suggested cyclical association with safety climate. (Williamson *et al.*, 1997)

Nevertheless, little is still known about the clear causal association of safety climate with these safety outcomes (accidents and injuries). Numerous studies have explored this relationship, however, and notwithstanding of their relevance, it is unclear whether their findings are able to establish causation or not. A bigger question is raised here, if we take the epidemiological causation criteria into consideration. Bradford Hill's criteria are one of the most widely

used methods for the establishment of a causal relationship. They address factors such as: strength of association, consistency, plausibility, coherence specificity, temporality and dose-response.

When further examining the 15 papers with evidence on the association under study (2-15, 17), it is important to note that in papers 12, 14 and 17 (showing the strongest associations) the relationship of SC with accidents or injuries was only found through bivariate correlation. Considering the limitations in this methodology, these were not taken as compelling evidence of the association on which this systematic review is focusing. Hence, only the remaining mentioned papers were considered potential providers of supporting evidence of the link between safety climate and accidents/injuries. As paper 3 and 6 presented weak associations, these were not seen as a source of sound evidence for this review.

Generally, all remaining studies (2, 4, 5, 7-11, 14, 15) showed consistency with existing research published in the area as well as among each other. These also present coherence since literature has shown the impact of organisational related aspects (even when not measured with SC) on safety performance and, in particular, accidents or injuries as previously mentioned. (Hofmann et al., 1995; Sawacha et al., 1999; Vredenburg, 2002; Clarke, 2006c; Beus et al., 2010).

On the other hand, although the results might show significant associations between SC and accidents or injuries, various bias can influence the findings obtained. Diverse studies (papers 2, 5, 7, 14, 15) used ***self-reported measures for data on occupational*** accidents or injuries which, combined with the self-

reported measurement of SC, can lead to common-method bias. Additionally, previous research showed that self-reported data may deflate statistical associations due to recall bias (Landen and Hendricks, 1995; Zwerling *et al.*, 1995), hence the use of official reported statistics for accidents and injuries in the companies would probably hold higher reliability. Considering this, although not excluding further studies, papers 4 and 8-11 can be seen as those with greater plausibility and potentially stronger or more valid evidence. All of these studies provide encouraging findings which partially support a link between safety climate and accidents or injuries. In particular, paper 8 brought forward sound evidence regarding the impact of this concept in the reduction of injury rate and injury probability.

Notwithstanding, since a cross-sectional design does not allow to ascertain whether the cause has preceded the outcome (in this case that an improvement in SC precedes lower accidents or injuries at work), the 15 of the included studies which had this type of design (87.5%) were unable to provide evidence on the causal association between safety climate and the outcome. On the other hand, study 10 and 16 (with quasi-experimental and longitudinal design) presented distinct results: the first evidenced a possible causal association whereas the latter was not able to find a significant relationship between safety climate and the outcome. Such results do not allow for a clear conclusion on the causal link to be drawn. In this review, only two studies warrant addressing causation and they hold opposite results.

There seems to be an abundance of encouraging evidence in this review which supports the potential impact that SC, and particularly its organisational

dimensions, can have on accidents or injuries in a company. Nevertheless, it would be premature to confidently conclude on the direction of a possible causation due to the cross-sectional design of most studies - although scientific literature has argued the many positive health and safety outcomes of a strong safety climate. Further research is needed to clearly demonstrate the direction of causation or a possible cyclical effect. Intervention studies with careful evaluation are needed to clearly demonstrate the reduction of accident and injury rates as result of an improved safety climate in addition observational longitudinal studies which could demonstrate the changes of safety climate in response to accidents and vice versa.

Although literature has argued the many positive health and safety outcomes of a strong safety climate, sound scientific evidence is still lacking to clearly demonstrate the reduction of accident and injury rates as result of an improved safety climate. While associations might have been established between these two variables, the causal pathways are unclear.

Further limitations on the evidence available for this relationship are also noticed when looking into the role of confounding in these analyses. As shown on this review, few studies considered confounders in their investigation of SC's impact on accidents or injuries. Therefore, it is difficult to determine what the main confounders are. Nevertheless, it is noticeable that confounders generally relate to characteristics of the work (i.e. shifts, departments, risk associated to the job), characteristics of workers (i.e. age, tenure) or characteristics specifically related to the outcome being measured (i.e. height of fall, surface landed). It also becomes pertinent to consider that these are aspects which

might act as contaminants of the data of the remaining studies, since they are not being considered in their analysis.

As an additional challenge in the understanding of confounding in the current review, a few of the studies which adjusted for confounders did not report the “raw” values for their associations. Therefore, it is not possible to contrast the results before and after an adjustment for confounders was done. Three of the five studies which adjusted for these, showed significant associations between SC and accidents or injuries. However, considering the restricted data available, one cannot clearly state that these have an impact on the strength or significance of the associations being explored. Literature has demonstrated that confounding is one of the main issues affecting diverse areas of research and skewing results (Axelson, 1978; MacKinnon *et al.*, 2000; Grimes and Schulz, 2002). However, this does not seem to be an aspect yet investigated in SC research. This review offered a first look into this issue demonstrating the necessity to include this in future safety climate studies for knowledge advancement in this area.

All the aforementioned illustrates the need for further research focused on this area and, most importantly, that it is now imperative to give special attention to the methodology applied and the quality of the data used in these studies. Only then, a comprehensive understanding of the significance of safety climate may be reached in order to fully acknowledge the relevance of SC at work. Although this concept's benefits have been widely argued and even substantiated in studies exploring diverse outcomes and settings that were not within the scope of this study, this review demonstrates that evidence is still lacking to show

how (or if) safety climate is, in fact, linked with two of the main safety performance indicators used by industry as it is the case of accident and/or injuries at work.

4.1. Limitations and strengths of the review

Although scientific papers published in 3 main languages were included in the current review, publications that were not written in English, Portuguese or Spanish were not reviewed. This excluded many other possible relevant studies written in other languages. This review focused exclusively on the industrial sector and conclusions cannot be drawn for other occupational settings. The papers included in the review were only from peer reviewed journals, hence publication bias cannot be ruled out. Furthermore, the diversity of outcomes used in the associations studied by each publication (i.e. self-reported accident/injury incidence; self-reported accident/injury rates; reported accident/injury incidence and rates) hindered the development of a thorough and accurate comparison between the findings of each paper. Additionally, bias cannot be ruled out as a single assessor determined the eligibility of studies for this review and conducted the quality assessment and data synthesis. However, this was partially mitigated by repeating the quality assessment and data synthesis process approximately six months after completion of the first appraisal. Although the review was conducted by one researcher, it was confirmed by a second researcher and possible discordances were discussed and clarified.

There is still an apparent weakness of evidence concerning the quality appraisal of publications in Occupational Health. The ability to provide a methodical

quality assessment for the included publications in this review strengthens this paper. Furthermore, this review had clearly defined inclusion and exclusion criteria, particularly in what concerns safety climate definition and its measurement. Finally, the data collection procedure and standardized data collection form applied in the data abstraction from the selected papers adds further quality to the current review.

5. Conclusions

5.1. Suggestions for further research

Considering the aforementioned, evidence is still insufficient to clearly understand the association of safety climate with accidents or injuries at work. Additional research in this area is required with strong study designs and rigorous control for confounding factors. Bearing in mind that the great majority of studies found were cross-sectional, there is a great need for cohort or intervention studies which would also allow establishing the causal link with higher confidence.

Furthermore, it would be pertinent to develop a systematic review on the association of safety climate with other occupational health and safety performance indicators, such as, lost-work-time, specific occupational illness/disorders rates, job satisfaction, among others. A study to explore the influence of safety climate on particular aspects of work (such as efficiency, job satisfaction, work engagement, among many other), based on a qualitative or observational assessment of this concept in the workplace would also be a relevant research to develop.

On the other hand, diverse papers in this systematic review revealed the existence of various aspects that may impact on safety climate in an organisation such as unionisation, tendering, among others. It would, therefore, be important to study the possible implications of such factors to safety climate.

Finally, a review of studies with similar focus to the one here presented, but based on different sectors, would be highly valuable since it would strengthen the generalizability of the findings.

5.2. Implications for practice

An in-depth understanding of safety climate, with sound scientific evidence of its relationships at individual, group and company level may lead to an evidence-based promotion of safety climate in organisations and implementation of its philosophy in the workplace at all levels.

The current review was not able to establish the clear causal link that SC might have with accidents and injuries. Nonetheless, it is important not to overlook the favourable and encouraging associations this concept showed with safety indicators. Current evidence still seems to suggest an impact of SC on accidents and injuries rather than an absence of effect between these. Furthermore, the results suggest that organisational dimensions of SC have a significant role in this relationship. Hence, one can presume that a more committed implementation of safety climate by all stakeholders in organisations has a greater potential to provide beneficial changes. This may present an advantage for organisations, not only at workforce level (presenting a healthier status at work and improved morale), but also for management providing a reduction of

compensation expenses, less staff turn-over, reduction of insurance premium costs, decrease of working lost-time, a more motivated and efficient staff and, thus, a possibility for improved productivity. Further research into the causal relationships of SC in industry will allow a clearer and more conclusive understanding of these dynamics and the impact of this concept on all the aforementioned aspects. This will also allow for a wider and more efficient integration of safety climate in the organisation's safety systems, and maximise potential benefits across the company.

Table 2.1 - Characteristics of publications included in this review

Study	Sample Size	Setting	Dependent Variables
1) Clarke, 2006(c)	185 individuals	1 car manufacturing company in the UK	Self-reported accidents
2) Gillen et al., 2002	255 individuals	Construction Companies in California (number not specified)	Self-reported injury Severity
3) Huang et al., 2006	2680 individuals	18 Companies (Manufacturing, Construction and Service Sectors) in the USA	Self-reported occupational injury
4) Lu & Tsai, 2008	291 individuals	31 Container Vessel (Shipping Industry) in Taiwan	Self-reported crew fatality rates
5) Probst, 2004	136 individuals	1 manufacturing company in the USA	Self-reported accidents & injuries
6) Siu et al, 2004	374 individuals	27 Construction sites in Hong Kong	Self-reported accident and Self-reported Occupational Health injuries
7) Zacharatos et al., 2005	196 individuals	2 Petroleum and telecommunication organizations in Canada	Self-reported injuries
8) Fullarton & Stokes, 2007	16 organisations	868 individuals from participating companies (sector not specified) in Australia	Companies' injury rates
9) Johnson, 2007	20 organisations	350 employees of a heavy Manufacturing company	Recordable injuries (%)

Table 2.1 (Cont.) - Characteristics of publications included in this review

Study	Sample Size	Setting	Dependent Variables
10) K. J. Nielsen et al, 2008	2 Manufacturing companies (from same corporation)	Individuals from Danish corporation: Plant A: T0 - 442; T1- 570 Plant B: T0- 388; T1- 341	Accident rates and Self-reported injury
11) Smith et al, 2006	33 organisations	41678 individuals from companies in various Industrial sectors in USA	Companies' injury rates
12) Varonen & Mattila, 2000	8 organisations	508 individuals from wood-processing companies in Finland	Reported accidents
13) Wallace et al., 2006	253 Centres of a same company	9429 individuals from diverse transportation & shipping centres of USA multinational company	Recorded driving accidents
14) Hofman & Stetzer, 1996	21 teams within same plant	204 individuals from chemical processing plant in Midwest in USA	Self-report of recordable accidents within a team
15) Oliver et al., 2005	510 individuals	90 companies (sector not specified) in Spain	Self-reported accidents
16) Kathryn Mearns, Whitaker & Flin, 2003	Individuals T1 – 682 T2 – 806	13 Oil gas Companies (off-shore) in the UK	Reporting of Injuries Diseases & Dangerous Occurrences Regulations (RIDDOR) rate, accident proportion and Self-reported injury
17) Vinodkumar & Bhasi, 2009	1806 individuals	8 Chemical Factories in India	Self-reported accident rate

Table 2.2 - Summary of findings from publications with analysis **at individual level**

Study	Association found with		Main Findings
	Overall SC	SC Dimensions	
1	N/A	N	There were weak and non-significant correlations between accidents and individual SC factors (for Management concern for Safety: $r = -.03$; Workers' response to safety: $r = -.11$; Conflict between Safety and Production: $r = -.00$).
2	P	N/A	Significant association found between SC and injury severity (Functional limitation) when adjusted for age, height of fall & surface landed on ($\beta = 0.179$, $p < .011$), SC influence on injury levels not explained by the regression model.
3	P	P	Correlations between each SC dimension and injury generally very weak. Full mediation was significant: <u>Direct association not found between SC and self-reported injury</u> ($r = -.08$, $p > .05$). Weak association found when <u>path between SC_(a) – Injuries_(b) was mediated by Safety Control</u> ($P_{ab} = 0.22$, $p < .05$).
4	N/A	Y	“Management Safety Practices” ($\beta = -0.47$, $p = .00$), “Safety training” ($\beta = -0.33$, $p = .03$) and “Job Safety” ($\beta = 0.70$, $p = .00$) showed the strongest <u>association with levels of crew fatality</u> .

Table 2.2 (Cont.) - Summary of findings from publications with analysis **at individual level**

Study	Association found with		Main Findings
	Overall SC	SC Dimensions	
5	Y	N/A	<u>Significant association between SC and workplace injury ($r = -.37; p < .01$ in correlation and $F(1,111) = 9.16; p = .003$ through MANOVA)</u> but not between SC and number of accidents.
6	Y	N	<u>Significant weak correlation “Safety Attitudes” - Occupational Injury ($r = -.16; p < .05$)</u> but not between “Safety Attitudes” - Accident Rates. “Communication” did not predict occupational injury or accident rates. SC predicted occupational injuries and there was an indirect relationship with accident rate mediated by psychological strains.
7	P	N/A	<u>Correlation SC-Accidents not significant</u> in mediated model. <u>Safety Incidents (accidents + near-misses)</u> significantly associated with SC ($r = -.35; p < .01$). SC was a mediator between High performance Systems and Safety Incidents.

SC: Safety Climate

Y= yes; N= No; P= Partial; N/A = Non-applicable

Table 2.3 - Summary of findings from publications with analysis at **group level**

Study	Association with		Main Findings/ Conclusions
	Overall SC	SC Dimensions	
8	Y	N/A	<u>Association found between SC and injury rate</u> ($\beta=0.47$, $p<.001$ – for unadjusted model; $\beta=0.57$, $p<.001$ – for adjusted model). <u>SC accounted for 23% of injury probability</u> and 33% after adjusting for collinearity of “behaviour and accident” and “safety education”. Injury rate was associated with the latent SC nature (SC factors measured) of the Safety Performance Survey.
9	P	N/A	SC was not directly associated with Injury rate, there was a significant relationship between them when mediated by Safety Behaviour. SC also showed an impact on injury severity ($r= -.50$; $p<.05$).
10	P	N/A	Although the difference found between plants (study and control group) was not significant, <u>number of self-reported injuries per individual in study group after SC intervention decreased from 2.29 to 0.91</u> . Linear trend in reduction of Lost Time Injuries was significant ($\chi^2 = 7.55$).
11	P	N/A	In models not adjusted for the inherent hazards of the industries, <u>SC was significantly related to the injury rates</u> ($\beta=-0.47$; $p<.01$). For adjusted model, the association was no longer significant ($\beta=-0.05$; $p= .74$)

Table 2.3 (Cont.) - Summary of findings from publications with analysis at **group level**

Study	Association with		Main Findings/ Conclusions
	Overall SC	SC Dimensions	
			SC dimensions <u>“Organizational Responsibility” & “Company Safety Precautions”</u> showing higher values in
12	N/A	Y	companies with lower accident rates and <u>significantly associated to these rates</u> ($r = -.771$; $p < .05$ & $r = -.848$; $p < .01$).
13	Y	N/A	<u>SC negatively associated with Accidents</u> ($r = -.26$; $p < .05$) and a <u>significant relationship</u> found between these two elements <u>in the mediation test</u> ($\beta = -.20$, $p < .05$). SC was also found as important mediator between Organizational Support and Management-Employee relations.
14	Y	N/A	<u>Safety climate was associated to raw accidents</u> ($r = -.61$; $p < .01$) and the square root transform of accidents ($r = -.66$; $p < .01$)

Y= yes; N= No; P= Partial; N/A = Non-applicable

SC: Safety Climate

Table 2.4 - Summary of findings from publications with analysis at group & individual level

Study	Association with		Main Findings/ Conclusions
	Overall SC	SC Dimensions	
15	N/A	P	<p>Individual Level Analysis: <u>Significant associations were found between each of the 5 SC factors and accidents</u> (e.g. Safety Goals and Standards: $\beta = -.324; p < .001$; Safety Management: $\beta = -.192; p > .01$; Safety Communication: $\beta = -.201; p < .01$) in the simple and <u>unadjusted model</u>.</p>
16	N	N	<p>Group level analysis: in the multiple hierarchical and <u>adjusted model</u>, these associations were <u>not statistically significant</u> (except Safety Goals and Standards: $\beta = -.246; p < .001$).</p>
	N	P	<p>Group Level analysis: <u>SC</u> (Safety Management Questionnaire) <u>with no significant association with self-reported accidents</u>. In year 1, only “Communication” showed significant association with Self-Reported Accidents ($r = -.56; p < .05$). In year 2, only “Involvement” had significant relationship with RIDDOR ($r = -.88; p < .05$). With ANOVA, scores in installations with higher accident proportions were less favourable for: “Involvement in HS” [$F(1.785) = 6.9; p < .01$]; “Work Pressure” [$F(1.777) = 5.9; p < .05$]; “General unsafe behaviour” [$F(1.761) = 4.6; p < .05$].</p>

Y= yes; N= No; P= Partial; N/A = Non-applicable

SC: Safety Climate

Table 2.4 (Cont.) - Summary of findings from publications with analysis at **group & individual level**

Study	Association with		Main Findings/ Conclusions
	Overall SC	SC Dimensions	
17	Y		Individual Level Analysis: <u>SC negatively correlated to Self-reported accident rate</u> ($r = -.79$; $p < .05$).
		Y	Significant associations also found between SC factors and accident rates: Workers' participation and commitment to safety ($r = -.92$, $p < .01$); Priority for Safety over production ($r = -.87$, $p < .01$); Worker's knowledge and compliance to Safety ($r = -.86$, $p < .01$); Management Commitment and actions for Safety ($r = -.73$, $p < .01$).
		Y	Group Level analysis: Low accident organizations showed higher values of SC (and its factors) and significant association found between this concept and level of accident rates (12.63 ; $p < .01$).

Y= yes; N= No; P= Partial; N/A = Non-applicable

SC: Safety Climate

Chapter 3 – Paper 2: Safety Climate and Occupational Accidents and Injuries: Contrasting Permanent and Contingent Workers

Safety Climate and Occupational Accidents and Injuries: Contrasting Permanent and Contingent Workers

Abstract

New types of contractual arrangements have arisen in the labour world. Research has shown that contracted workers (contingent workers) have higher accident rates, less positive safety attitudes, lack confidence in the host organisation and hold greater safety concerns than permanent workers. However, little research has studied the safety perceptions of workers with different contractual agreements. This study examines differences in safety climate perceptions between permanent and contingent workers and its associations to accidents/injuries in an organisation, considering possible relevant confounders.

A questionnaire was distributed to all 367 workers in an Irish chemical plant with a 65% response rate. The “Safety Climate Toolkit” (Cox & Cheyne, 2000) was used to measure safety climate. Associations of safety climate with employment status and with self-reported occupational accidents/injuries were studied through logistic regression modelling adjusting for seniority, gender, time since last health and safety training and job type.

Permanent workers showed higher probability to experience an accident/injury than contingent workers (OR=2.897, 95% CI 1.082-7.755). Accidents/injuries were significantly associated with the total safety climate score (OR= .744, 95%CI .556-.995) and with its dimensions (i.e. Management Commitment, Communication, Work Environment) in permanent workers but not in contingent workers.

Permanent workers seem to be at higher risk of occupational accidents/injuries in this particular company. Organisational safety climate perceptions appear to be significant predictors of accidents/injuries although for permanent workers only. Several biases may have impacted on these findings. However, the results may also reflect labour market changes in work characteristics of contingent workers who may not be exclusively limited to hazardous low qualified work. Further research is warranted with careful analyses of different types of employment contracts in relation to safety climate and accidents/injuries.

Key terms

Employment Status, Safety Perceptions, Contracted Workers, Organisational Safety Climate, Safety Performance, Temporary Work.

1. Introduction

In recent decades, the restructuring of the labour market brought new organisational structures with less permanent workers and more temporary, casual or short-term contracts leading to the increase of contingent workforce. Generally, in modern companies, two main employment arrangements can be found: core or permanent employees and peripheral or contingent workers (Belous, 1995). Although a particular definition has not been established for contingent work, this generally includes arrangements ranging from fixed-term contracts (and project based arrangement), temporary-help services, seasonal employment or employee leasing, to self-employment positions (Aronsson, 1999; Clarke, 2003).

At European level, statistics have shown a general increment in the percentage of contingent workers in the past years, from 12.3% in 2002 to 13.7% in 2012 across the EU28. An even greater increase was verified in Ireland from a 5.3% average of contingent workers in 2002 to 10.2% for 2012 (Eurostat, 2013).

Hence, contingent workers have become the object of research of diverse scholars with in-depth studies of their main work characteristics, the implications of these types of employment to the dynamics within organisations and to the health, safety and wellbeing of workers (Kochan *et al.*, 1994; Belous, 1995; Aronsson, 1999; Quinlan, 1999; Goudswaard and Andries, 2002; Clarke, 2003; Guadalupe, 2003; Bernhard-Oettel *et al.*, 2005). Research has shown that contingent workers generally present higher accident and injury rates compared to permanent employees (Kochan *et al.*, 1994; Rousseau and Libuser, 1997; Quinlan, 1999; Guadalupe, 2003).

In what concerns work characteristics, studies evidenced that contingent workers are, overall, placed at higher risk jobs with poorer conditions and have less access to training and other resources than permanent employees (Kochan *et al.*, 1994; Aronsson, 1999; Quinlan, 1999; Park and Butler, 2001; Goudswaard and Andries, 2002; Guadalupe, 2003). Companies tend to prioritise permanent employees when providing training and additional resources. In addition, the absence of links with colleagues or with the employer also frequently perpetuates a general lack of work and safety information among contingent workers which might be easily available to those internal to the company (Kochan *et al.*, 1994; Aronsson, 1999; Park and Butler, 2001).

From a health and safety (H&S) perspective, it has been shown that employees with a non-permanent contractual arrangement show less trust in their host organisation, lower loyalty to their employer and reduced commitment to its safety procedures and policies (Aronsson, 1999; Clarke, 2003; Luria and Yagil, 2010). This might lead to a situation where workers are less involved in or committed to the Safety Culture and Climate of the company and thus might engage in lenient (or riskier) actions and hazardous practices (Wright and Lund, 1996).

Safety climate (SC) is generally understood as the individuals' perceptions of the occupational health and safety practices in the company and the level of priority this holds in the organisation (Zohar, 2003; DeJoy *et al.*, 2004). This concept has been linked to work safety behaviours and was established as a significant predictor of safety outcomes (Griffin and Neal, 2000; Siu *et al.*, 2004; Pousette *et al.*, 2008; Jiang *et al.*, 2010). Recent literature also found that safety

perceptions are not uniform across an organisation and, more importantly, that contingent workers hold more negative safety attitudes and views of their host organisations than permanent employees. This illustrates the relevance of studying safety climate as a significant factor in the health and safety performance of individuals under diverse employment agreements (Clarke, 2003; Luria and Yagil, 2010).

Additionally, it has been evidenced that contracted workers are under higher pressure to perform and achieve higher standards in order to secure future work or in the hope of accomplishing a permanent position, due to the job insecurity inherent to contingent employment (Quinlan, 1999; Guadalupe, 2003). This increase in job intensity and pressure may lead individuals to overlook safety precautions (or requirements) and make mistakes which can impact on the workplace's H&S. Literature has also demonstrated that high achievement pressure can be the precursor to conflicts between contingent workers and their permanent colleagues. This can become a barrier to the working relationships between the two groups. Hence, issues of lack of support or poor communication might arise in the organisation as well as challenges regarding non-permanent workers getting their safety concerns heard (Aronsson, 1999; Clarke, 2003). The lack of camaraderie together with the lower loyalty towards the company may also lead to a general scenario where contingent workers are less likely to participate in safety discussions or become part of safety committees or further unionised initiatives. Ultimately, this prompts contingent workers to have a more passive role in what concerns their occupational health and safety (Kochan *et al.*, 1994; Park and Butler, 2001).

The link between hazardous job characteristics of the contingent workforce and the possible impact on occupational health and safety issues has been well established throughout the literature. Additional associations with psychosocial work characteristics (e.g. higher job demands and fatigue, lower control and job satisfaction, among others) and physiological health complaints (such as back and muscular pain, heart disease, musculoskeletal disorders, among others) have also been documented (Bosma *et al.*, 1998; Benach *et al.*, 2002; Goudswaard and Andries, 2002; Bernhard-Oettel *et al.*, 2005; Silla *et al.*, 2005).

To obtain a clearer understanding of this situation, it is essential to study in further detail, not only the characteristics of temporary work arrangements, but also how perceptions of the working environment, the safety culture and safety attitudes differ under diverse contractual arrangements (Alexander *et al.*, 1994; Mearns *et al.*, 1998; Clarke, 2003; Bernhard-Oettel *et al.*, 2005). However, in what concerns safety climate and its possible association with employment status and safety outcomes, the literature is still quite scarce.

The current study was designed to address safety climate as a key element to further understand the commonly reported higher accident, incident and injury rates of temporary workers. Thus, this study aims to examine differences in the safety climate perceptions among permanent and contingent workers and their possible associations to accidents and injuries in an organisation with the following hypotheses:

H1. Perceptions of safety climate, and each of its dimensions, will differ between contingent workers and their permanent colleagues.

Based on the current research it is hypothesised that contingent workers will present lower levels of safety climate and of each of its individual dimensions.

H₂. Contingent workers have higher probability of being involved in accidents or injuries at work.

It is predicted that employment status is associated with occupational accidents/injuries.

H₃. Safety climate, and its individual dimensions, will show stronger associations with occupational accidents or injuries in permanent employees than in contingent workers.

Based on previous research, this hypothesis presupposes that permanent employees are more engaged and committed to the company's safety climate and, hence, this concept will have a higher impact on their probability of accidents or injuries.

2. Methods

2.1. Study setting, sample and data collection

The current study was developed in a chemical plant of a multinational company based in Ireland. Individuals from all levels in the company were included in the data collection. The questionnaire was distributed to workers from senior and middle management and to process operators with three main contract types: permanent employees, nested contractors and non-nested contractors. Permanent employees had a contract without a pre-determined end date. They were paid directly by the company with full access to employee benefits package. The remaining staff in this plant were contractors. A nested

contractor was an independent worker who provided a particular service and was remunerated directly by the organisation. These contractors were usually integrated with the general workforce but hired as an independent or self-employed worker and not entitled to the main employee benefits. Finally, individuals working for another company or agency which, in turn, was providing a service to the host organisation under study were considered non-nested contractors. These contractors were usually not fully integrated in the general workforce. Catering or cleaning staff would be an example of the latter.

A web-survey was emailed to all 314 workers from all Departments after exclusion of 10 workers who had participated in the pilot study. For the 32 individuals who did not have access to the company's email, a self-completion hardcopy of the questionnaire was provided by the researcher in a meeting organised for this purpose. A total of 346 questionnaires were distributed. There was no involvement from any of the company personnel in the data collection or analysis process to ensure the confidentiality and anonymity of the participants.

Of the 346 distributed surveys, 226 were returned generating a response rate of 65.3%. Following preliminary analysis, it was noticed that 24 of the questionnaires were incomplete and thus deemed invalid for the study. A total of 202 questionnaires were included in the final data analysis.

Of those who did not complete the questionnaire, 75.6% were male and 24.4% were female. The majority of these non-participants were permanent workers (64.4%) with 33.3% Operations or Maintenance; 28.9% Administrative or Management; 14.1% Quality Control; 7.4% Project Engineering, and 16.3% non-

specified role. These non-responders held similar characteristics to the participants, reducing the possibility of selection bias.

Ethical approval was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospitals, Ireland. Formal consent was obtained from each participant during data collection and the confidentiality and anonymity of respondents was ensured. Data was collected during a period of 21 days throughout the months of April and May in 2013 and subsequently analysed on IBM SPSSv20.

2.2. Measures

The questionnaire included questions related to demographics, seniority (years of experience in the company), history of accident or injury, frequency and pertinence of H&S training and safety climate perceptions. Safety climate was assessed through the validated Loughborough University “Safety Climate Toolkit” (Cox and Cheyne, 2000) which included 9 dimensions summary scales. Each individual question presented a 5 point Likert scale response format (Strongly Agree, Agree, Neither Agree nor Disagree, Disagree and Strongly Disagree). A total summary score measuring safety climate’s overall value was obtained by totalling all scores.

The individual safety climate dimensions were: Management commitment (7 items) - Perceptions of management’s commitment to health and safety issues in the organization ($\alpha = .823$); Communication (5 items) - The nature and efficiency of H&S communication within the organization ($\alpha = .700$); Priority of Safety (4 items) - The relative status of H&S issues within the organization ($\alpha = .774$); Safety Rules and Procedures (3 items) - Views on the efficacy and

necessity of rules and procedures ($\alpha = .661$); Supportive Environment (6 items) - The nature of the social environment at work, and the support derived from it ($\alpha = .562$); Involvement (3 items) - The extent to which safety is a focus for everyone and all are involved ($\alpha = .635$); Personal Priorities and Need for Safety (5 items) - Individuals' view of their own H&S management and need to feel safe ($\alpha = .554$); Personal Appraisal of Risk (4 items) - How individuals view the risk associated with work ($\alpha = .537$); Work Environment (6 items) - Perceptions of the nature of the physical environment ($\alpha = .719$).

Individuals were also asked if they had ever experienced an accident and/or injury while working in the plant. Company data on officially reported accidents and injuries was not used as it only encompassed incidents of higher severity and thus presented a very small proportion of the accidents or injuries occurred. Hence, for the purpose of the current study, the self-reported numbers were deemed more relevant.

The variable "employment status" was self-reported and respondents were classified as permanent or contingent workers (nested or non-nested contractors). For all analyses, nested and non-nested contractors were aggregated into a group denominated "contingent workers" to ensure sufficient cell sizes.

The questionnaire was piloted on a group of 10 workers with a range of ages, work experience, job type, employment status and gender. Following this although a few minor formatting issues were raised and corrected, the content of the questionnaire was considered adequate and did not require amendments.

2.3. Data Analysis

An independent samples t-test was performed to study the potential link between employment status and safety climate (and each individual dimension) (H1). To adjust for differences in socio-demographics between temporary and permanent workers, this link was also studied through multiple linear regression with adjustment for the covariates gender, seniority and age.

The association of employment status with accidents or injuries at work (H2) was explored through logistic regression modelling. Model 1 presented the unadjusted values, Model 2 was adjusted for gender, seniority and job type and Model 3 additionally adjusted for age. The dependent variable, accidents and/or injuries reported by the participants, was dichotomous and coded as 0= No (had never experienced an accident or injury) and 1= Yes (had experienced an accident or injury).

Similarly, logistic regression analysis, stratified by employment status, was performed to model the association of each safety climate dimension (independent variables) with self-reported accidents and injuries (H3). Each stratified analysis was adjusted for seniority, gender, job type and time since last H&S training.

3. Results

Table 3.1 shows the main socio-demographic characteristics of the study's sample.

As presented in Table 3.2 there were no major differences in gender among the two types of employment status. Temporary workers were slightly younger

than permanent employees and had less seniority in the company. Permanent workers were mainly clustered in “administrative, clerical or management” positions (44%) and “maintenance or operations” roles (43.1%). Contingent workers showed a more even distribution across the various job types.

The t-test comparing the total safety climate score means by employment status, to test hypothesis H₁, did not yield a significant difference with a mean of 18.33 for permanent workers, and a mean of 18.55 for temporary workers (mean difference: -.217 t= -.585, p=.559). The means for the safety climate dimensions were similar in both types of employment status as well (data available upon request). Similarly, multiple regression modelling with employment status as indicator variable and adjustment for gender, seniority and age did not yield any statistically significant regression coefficient for employment status (data available upon request).

According to the data in Table 3.3, employment status presented a significant positive association with accidents or incidents at work in both the unadjusted (OR= 3.337; 95%CI 1.379- 8.266) and the adjusted models (OR= 2.897; 95%CI 1.082 - 7.755 for model 3).

For the total sample, the association of the total safety climate score as well as each dimension’s score with accidents/injuries (Table 3.4) was not significant in the adjusted model, with the exceptions of the dimensions “involvement” (OR=1.362; 95%CI 1.088 - 1.705) and “work environment” (OR= .871; 95%CI .775 - .979). In the stratified regression analysis (Table 3.4), only the models developed for permanent workers showed significant associations between safety climate (or its dimensions) and accidents/injuries (i.e. “safety climate”,

“management commitment”, “involvement”, “communication” and “work environment”). The total score of safety climate showed a significant relationship with accidents or injuries but only for permanent workers. All of the aforementioned safety climate dimensions held the expected inverse association with “accidents or injuries” with the exception of “involvement” which presented a positive relationship with the outcome. These findings, suggest that with an increase in one unit in the scale of perceptions of management commitment to safety, the odds of work accidents or injuries decrease by 12.7% (OR= .873; 95% CI .770 - .989). These odds are also reduced by 16.6% with the increment of one unit in the communication scale (OR= .834 CI .707 - .984) and by 16.8% for each unit increase in the safety climate perceptions of work environment (OR= .832; 95% CI .721 - .959).

None of the safety climate dimensions presented a significant association with accidents and/or injuries at work for contingent workers. For this group, the total SC scores and all dimensions of SC were positively, albeit not significantly, associated with the outcome.

4. Discussion

This study set out to examine differences in perceptions of safety climate and accidents/injuries experienced by permanent and temporary (contingent) workers within one company, with careful adjustment for potential confounding factors generated by dissimilarities in socio-demographics or degree of hazardousness of work.

Contrary to our expectations, when testing Hypothesis 1 we observed an absence of a significant difference in safety climate between permanent and

temporary workers. This could indicate that the safety values and priorities presented to contingent workers in the studied company did not differ greatly from those established for permanent employees. Furthermore, these results may be indicative of the development of a strong safety system and culture within the company under study. This encompassed company efforts to improve the work characteristics and conditions for contingent workers as well as a greater involvement and inclusion of these individuals in the workplace environment and culture.

Previous literature generally suggests the existence of variance in safety climate according to contract type (Kochan *et al.*, 1994; Rousseau and Libuser, 1997; Quinlan, 1999; Guadalupe, 2003). However, studies by Bahari (2011) and Depietro (2012) which, similar to the current study, were performed in a single manufacturing company, showed similar results to those presented here, with no difference in the safety perceptions of contingent and permanent workers. These findings might be illustrative of changes happening within the labour market with the non-permanent work group no longer being composed solely, or mainly, of non-specialised trade workers or operators, as previously found. In the current sample, this workgroup also included individuals with higher qualifications and those performing specialised work.

There was also no evidence to support Hypothesis 2. Although employment status was significantly associated with accidents or injuries at work while controlling for major confounders, the positive direction of the association was unexpected. The results suggest that the odds of permanent workers being

involved in accidents/injuries were 2.9 higher when compared to their contingent colleagues.

Permanent workers, by having higher seniority, may also have a greater chance to be involved in an accident/injury. However, the statistical analyses controlled for seniority and we are confident that this confounder did not affect the results in a major way.

While the vast majority of literature suggests that contingent workers are at higher risk of accidents/injuries, there is also conflicting evidence, mainly from single-company studies (Gethins, 2014). Sakurai *et al.* (2013) noticed that for direct hire contractors (the group that also composes the majority of contingent workers in the current sample), there was no difference in the injury probability when compared to permanent employees. Additionally, the authors noticed that, in their study's manufacturing company, the higher risk of injury only occurred in the group of temporary agency workers (Sakurai *et al.*, 2013). This study also evidenced the importance of analysing each type of contingent work differently, as they might be affected by safety climate and working conditions in diverse ways. A study using Finland's national databases (Saloniemi and Salminen, 2010) also found that temporary workers did not have higher injuries than permanent employees. Similar research in Spain, (Benavides *et al.*, 2006) found that associations between accidents and employment status lost significance when adjusted for gender, age, length of employment and job type.

Under-reporting of accidents and injuries by contingent workers may be an issue, as contingent workers may wish to show higher performance in order to

prolong their employment or obtain a permanent contract. Additionally, since temporary workers are not entitled to paid sick leave, they may underreport injuries. This issue was recognised by Villanueva and Garcia (2011) in their study at national level in Spain, and might have also led to a potential systematic bias in the current data causing permanent workers to appear as those with higher amounts of reported accidents or injuries. Contractors may also underreport the issues brought up by their workers to the host company as it may affect the success of their tendering (Gyi *et al.*, 1999; Guadalupe, 2003; Benavides *et al.*, 2006).

The evidence for Hypothesis 3 was mixed. We had hypothesised stronger associations between safety climate and accidents in permanent workers. Although we found associations of safety climate with accidents/injuries of similar strength for both contingent and permanent workers, the Odds Ratios (ORs) were generally below 1 for permanent workers and above 1 for contingent workers. Nevertheless, the associations were only significant for permanent workers, particularly for organisational dimensions of safety climate (i.e. management commitment to safety, communication and work environment). The non-significance of the associations in the small sample of contingent workers was possibly due to statistical power issues.

The association of accidents/injuries with “involvement in safety” was also significant but positive in permanent workers. Hence, the increase in involvement of permanent employees in safety seemed to lead to an increment of 41% in the odds of experiencing an accident/injury. These unexpected findings differ from those presented by Amuedo-Dorantes (2002), Mearns *et al.*

(2003), and Vinodkumar and Bhasi (2009) who found a significant but negative association between accidents or injuries and involvement in safety. A possible explanation for the findings in the current study is that individuals with higher involvement in the company's H&S would be more aware and sensitised to safety issues. Hence, their understanding of what represents an accident or an injury can be quite different from that of an individual not involved in workplace H&S. A minor incident such as a slip and fall might be overlooked as an accident to those with lower involvement in safety, whereas workers more engaged in safety issues, policies and practices might report this event. Considering the self-reported nature of accidents and injuries in this study, it is possible that individuals with higher involvement in H&S might have over-reported accidents/injuries, introducing systematic reporting bias. The absence of a severity measure of accidents or injuries reported, and the exclusive reliance on self-reported data might have been limitations in the analysis of the relationship of "involvement in safety" with "accidents and injuries". Thus, additional research is required to explore these associations with further clarity.

Interestingly, the adjusted ORs for permanent employees had consistently the opposite direction of the values for contingent workers. The associations were generally negative for permanent workers and positive for contingent individuals (although non-significant). With the increase of each safety climate dimension score, contingent workers seem to be more likely to be involved in accidents or injuries. However, since this study was based on self-reported data, these results may also mean that, with the increase in each specific safety climate dimension, contingent workers might be more likely to report

accidents/injuries since they may be less concerned or fearful that their performance assessment, and hence their chance of maintaining employment, might be affected by the amount of accidents/injuries reported.

The current findings corroborate that safety climate is a significant predictor of accidents/injuries at work as previously evidenced in numerous studies (Flin *et al.*, 2000; Christian *et al.*, 2009; Beus *et al.*, 2010). However, the existing research in this area does not seem to focus on the differential effects that safety climate may have on different employment status groups, which warrants further studies.

Interestingly, these results also reflect that there was no difference in the safety climate scores between the two employment status groups. This may suggest that, in the current sample, contingent workers had perceptions at a similar level to permanent employees. According to the findings, perceptions of safety climate may have differential impact on the two groups. In permanent but not in contingent workers, a strong SC may contribute to low accidents or injuries whereas a weak SC may contribute to high accidents and injuries as also shown in previous research (Flin *et al.*, 2000; Christian *et al.*, 2009; Beus *et al.*, 2010).

Several methodological limitations need to be taken into consideration when interpreting the results. These are mainly related to the use of a sample from one single plant (total population sampling) which limits the generalisability of results to other settings. The response rate was acceptable (65.3%).

Considering its cross-sectional design, this study could not establish causality between safety climate and accidents/injuries. Common methods bias might also affect the associations, as self-reported measures were used for both, the

exposure and the outcome. However, as previously mentioned, company data on officially reported accidents and injuries was not used as it only encompassed incidents of higher severity and thus presented a very small proportion of the accidents or injuries occurred. Additionally, although modest, there is a possible interference of “healthy worker effect” as the survey might not include individuals on prolonged sick leave.

The reliability of most of the scales for the measurement of safety climate was good, however a few scales showed relatively low internal consistency values suggesting that the variables did not measure a coherent concept. Nevertheless, this may have resulted in a conservative bias as it generally results in an attenuation of the associations.

Although the specific results are potentially not generalizable to all settings they suggest that future studies on associations between safety climate and accidents should carefully analyse effect modification (and differential associations) for the respective groups of employment status as effects may be masked or severely diluted if populations include permanent and temporary workers.

4.1. Further research and implications for practice

Additional knowledge and research is needed on what concerns the different characteristics of temporary work that contribute to accidents and injuries, such as job insecurity, performance pressure, amongst others. .

The significant positive associations of accidents/injuries with organisational safety climate dimensions (management commitment to safety, communication and work environment) in permanent workers illustrate that work organisation and its management plays an essential part in occupational H&S outcomes

although organisations often consider individual-focussed factors and behaviours as the main aspects influencing company's safety performance. The relevance of the organisation and management measures for safety performance has also been noticed by Cooper and Phillips (2004), Beus *et al.* (2010), Griffin and Neal (2000) and Zohar (2003).

This study's results might also be affected by the aggregation of nested and non-nested contractors into one group, as required for the data analysis. As Silla *et al.* (2005) and Luria and Yagil (2010) argued, it is not correct to assume that all non-permanent workers are similar and can form a homogeneous group.

Hence, further research is required with properly defined groups of contingent workers, exploring their characteristics and potential links to various occupational safety outcomes such as accidents injuries, work days lost, near misses, amongst others (Quinlan, 1999; Clarke, 2003; Bernhard-Oettel *et al.*, 2005).

Authors have mentioned the importance of reflecting on the applicability of safety climate's measurement tools for contingent workers (Sparer *et al.*, 2013; Zohar and Polachek, 2014; Sparer, 2015). Although research on this topic is scarce, it seems relevant to ensure that the safety climate questionnaires applied are appropriate for the diverse groups of employment status present in the labour force. Finally, one of the main limitations of this study was the self-reported nature of the outcome data used. Hence, it would be interesting to perform a similar study with data from officially reported safety outcomes.

In summary, the current study showed the importance of addressing the heterogeneity of contractual arrangements found in a company and their

impact on occupational health and safety performance. It becomes essential that occupational H&S practices and policies consider this new characteristic of work carefully. H&S management and precautions should provide greater focus on the heterogeneity in the workforce ensuring that the particular demands raised by the various contract types in the company are properly attended to.

Table 3.1 – Sample Characteristics of accidents/injuries (n=202)

	Frequency	
	N	%
Gender		
Male	157	77.7
Female	45	22.3
Total	202	100
Job type		
Operations/Maintenance	73	36.1
Admin./Clerical/Management	70	34.7
Quality Control	15	7.4
Project Engineer	19	9.4
Other (non specified)	25	12.4
Employment Status		
Permanent worker	126	62.4
Contingent worker	69	34.2
Undetermined	7	3.5
Last H&S Training		
More than 1 year ago	13	6.4
More than 6 months ago	22	10.9
More than 1 month ago	59	29.2
1 month ago or less	106	52.5
Accidents/Injuries		
Yes	58	28.7
No	141	69.8
Age		
Max.	63	.
Min.	19	.
Mean and Median	39 (SD 9.14)	.
Seniority (Years)		
Max.	33	.
Min.	0	.
Mean	8 (SD 8.76)	.

Table 3.2 – Characteristics of Individuals by employment status (n=202)

	Permanent worker		Contingent*	
	n	%	n	%
Gender				
Male	101	80.2%	53	76.8%
Female	25	19.8%	16	23.2%
Age (years)				
<= 30	7	5.7%	18	28.1%
30 – 45	79	64.8%	33	51.6%
46 – 60	34	27.9%	11	17.2%
>= 60	2	1.6%	2	3.1%
Seniority (years)				
<=1 - 5	38	32.5%	38	60.3%
6 - 10	22	18.8%	12	19.0%
11 - 15	21	17.9%	6	9.5%
>=16	36	30.8%	7	11.1%
Job Type				
Op./ Maint.	50	43.1%	23	33.3%
Admin./ Clerical/ Mng.	51	44%	19	27.5%
QC	7	6.0%	2	2.9%
PEng	8	6.9%	6	14.5%
Other (not mentioned)	10	7.9%	15	21.7%
Accidents				
Yes	48	38.7%	10	14.7%
No	76	61.3%	58	85.3%

* Independent worker or Working for another company; Op. – Operations; Maint. –Maintenance; Admin. – Administrative work; Mng. –Management; QC – Quality Control; PEng. – Project Engineering

Table 3.3 – Association of accidents/injuries with employment status
(unadjusted and adjusted models)

	Model 1			Model 2			Model 3		
	Crude	C.I.		OR	C.I.		OR	C.I.	
	OR	Lower	Upper		Lower	Upper		Lower	Upper
Employment Status	3.377	1.379	8.266	3.019	1.135	8.034	2.897	1.082	7.755

(Reference group = contingent workers; Model 1 – Unadjusted model; Model 2: Adjusted for Gender, Seniority and Job Type, $\chi^2 = 28.438$, $p = .000$; Model 3: Adjusted for Age, Gender, Seniority and Job Type, $\chi^2 = 29.246$, $p = .000$)

Table 3.4 – Association of safety climate and individual dimensions scores with accidents/injuries at work, stratified by main employment status (unadjusted and adjusted models)

	Permanent worker						Contingency worker						Full sample					
	Model 1			Model 2			Model 1			Model 2			Model 1			Model 2		
	Crude OR	C.I. Lower	Upper	OR	C.I. Lower	Upper	Crude OR	C.I. Lower	Upper	OR	C.I. Lower	Upper	Crude OR	C.I. Lower	Upper	OR	C.I. Lower	Upper
Management commitment	.865	.785	.954	.873	.770	.989	1.218	.936	1.584	1.361	.957	1.936	.895	.822	.974	.928	.841	1.024
Communication	.816	.709	.938	.834	.707	.984	1.162	.835	1.616	1.550	.886	2.712	.850	.755	.957	.878	.767	1.004
Priority of Safety	.859	.742	.994	.858	.711	1.034	1.517	.955	2.409	1.858	.962	3.589	.899	.791	1.023	.933	.803	1.084
Safety Rules & Procedures	.825	.697	.975	.820	.665	1.011	1.090	.742	1.601	1.475	.861	2.529	.876	.758	1.012	.952	.803	1.128
Supportive Environment	.940	.820	1.077	.958	.814	1.128	1.047	.793	1.381	1.119	.771	1.625	.967	.859	1.090	1.008	.882	1.152
Involvement	1.252	1.035	1.514	1.411	1.089	1.828	1.440	.920	2.253	1.672	.852	3.284	1.239	1.048	1.465	1.362	1.088	1.705
Personal Priorities	.884	.730	1.071	.952	.785	1.153	1.105	.764	1.598	1.356	.787	2.336	.965	.834	1.117	.999	.848	1.178
Personal Appraisal of Risk	.891	.756	1.050	.932	.751	1.158	.825	.594	1.148	1.030	.695	1.527	.879	.763	1.014	.916	.764	1.098
Work Environment	.849	.756	.953	.832	.721	.959	1.006	.789	1.282	1.045	.789	1.383	.869	.787	.959	.871	.775	.979
Safety Climate (total score)	.798	.652	.977	.744	.556	.995	1.208	.759	1.924	1.530	.785	2.981	.841	.707	.999	.882	.715	1.088

Model 1 – Unadjusted model; Model 2 – Adjusted for Seniority, Gender, time since last HS Training and Job Type

Chapter 4 – Paper 3: Psychosocial, Health Promotion and Safety Culture Management - Are Health and Safety Practitioners involved?

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Psychosocial, Health Promotion and Safety Culture Management - Are Health and Safety Practitioners involved?

Abstract

Health and Safety Practitioners (HSPs), as frontline professionals advocating for the Occupational Health and Safety (OHS) conditions at work, have a pivotal role in an organisation. Over the last number of years, the nature of work has changed; the assessment and management of psychosocial risk factors and health promotion are now additional core challenges in OHS. This study aims to investigate the HSPs' main tasks and their involvement in activities regarding the management of Psychosocial risk factors, Safety Culture and Health Promotion (HP) within their organisations. Data from 879 HSPs was collected through a web-survey of members of the Institution of Occupational Safety and Health (IOSH) in Ireland and the UK. The questionnaire was adapted from Hale *et al.* (2005) and Jones (2005) concerning the OHS structure in the HSP's organisation, his/her main areas of activity and a list of the most common tasks performed by European HSPs. Chi-square analysis was used to assess the association between HSPs organisational and job characteristics and their involvement in the management of Psychosocial risk factors, Safety Culture and Health Promotion. Logistic regression was used to ascertain organisational predictors of the HSPs' involvement in these tasks. There was no variation in the proportion of HSPs performing tasks related to Psychosocial risk factors by company size, job title nor sector of activity. Safety Culture (86.8%) and Health Promotion-related tasks (64.2%) were a greater part of the HSPs job than psychosocial activities (30.8%). Those in the "Agriculture, forestry/fishing, mining/quarrying" sector were most involved in these activities (HP 84.4%; Safety Culture 90.6%). HSPs with "Manager, Director, Head, Lead, Coordinator" roles were more likely to perform Health Promotion and Safety Culture-related activities independent of industrial sector or company size. HSPs do not seem to take

an active role in Psychosocial risk factors' assessment and management in most workplace settings. The results highlight the challenge in ensuring a holistic and multidisciplinary approach for prevention of Psychosocial risk factors for integrated OHS management.

Keywords: Psychosocial risk factors; Health Promotion; Safety Culture; Health and Safety Practitioner; Occupational Health and Safety Management

1. Introduction

Health and Safety Practitioners (HSPs) are the frontline professionals responsible for ensuring adequate working conditions and for promoting the health and wellbeing of individuals at work. They are known by a variety of titles such as 'Health and Safety Officer or Adviser', 'Health and Safety Manager or Director', reflecting varying demands, levels of responsibility and relative position in the organisation (Jones, 2005).

In Europe, the main tasks and work characteristics of the HSPs relate to risk assessment and workplace inspections, ensuring compliance with the law and providing advice and information to workers and managers (Hale *et al.*, 2005). HSPs core duties have extended beyond the more traditional legally required tasks, to include management systems, safety culture, safe behaviour issues and assessment of designs (Jones, 2005; Leka *et al.*, 2008). However, in 2012, HSPs in a survey from the Institution of Occupational Safety and Health (IOSH) felt that organisational commitment towards OHS was lower than in previous years. These practitioners also highlighted the need to change organisational culture on health and safety issues and to integrate OHS into everyday business operations (IOSH, 2012).

Work conditions and environment have changed significantly in the past years due to labour restructuring, economic downturn, technology, increasing globalisation and workforce demographic changes (Kompier, 2006; Koukoulaki, 2010; Papadopoulos *et al.*, 2010; Eurofound and EU-OSHA, 2014). At the same time, psychosocial or organisational risk factors have emerged as core concerns in OHS (Kompier, 2006; Dollard *et al.*, 2007; Eurobarometer and TNS Political &

Social, 2014; Eurofound and EU-OSHA, 2014) and a shift in OHS priorities has been recommended as a result (Gabriel and Liimatainen, 2000; Burton, 2010). Psychosocial and organisational risk factors relate to the way work is structured, distributed, processed and supervised (Hagberg et al., 1995), its design and management, and its social and organisational contexts that have the potential for causing psychological or physical harm (Carayon and Lim, 1999; Cox and Griffiths, 2005; Leka and Jain, 2010).

Safety Culture consists of the overall attitudes, (implicit) assumptions, beliefs, perceptions and habits within an organisation that are relevant for OHS. However, the conceptualisation of Safety Culture has changed substantially over time in order to encompass the current understanding of OHS and the characteristics of the work environment (Reichers and Schneider, 1990; Cooper, 2000; Guldenmund, 2000). With the growing importance of Psychosocial risk factors, it is important that these are included as part of the policies, procedures and activities of an organisation and are also reflected in the Safety Culture of an organisation (Ilgen, 1990; Leka *et al.*, 2010; International Labour Organization (ILO), 2014).

In 2014, the International Labour Organization noticed the need for an update of the HSPs role with prioritisation of Psychosocial risk factors (International Labour Organization (ILO), 2012; 2014) as a link has been widely shown between these risks and physical and mental health and wellbeing (Cox *et al.*, 2000; Stansfeld and Candy, 2006b; Leka *et al.*, 2010; Nieuwenhuijsen *et al.*, 2010).

As the area of health through which people are enabled to increase control over, and to improve, their wellbeing (World Health Organisation, 1986), Health Promotion has recently received greater attention as part of OHS. Health Promotion is known to be one of key strategies for the management of Psychosocial risk factors and the prevention of issues stemming from these (Leka *et al.*, 2015). Therefore, this has also been recognized as an important area to prioritise in the management of OHS and in the roles and responsibilities of HSPs within their organisations.

Recent studies show that the consequences and health impacts related to psychosocial and organisational risk factors are still rising (Malard *et al.*, 2013; Eurobarometer and TNS Political & Social, 2014; Eurofound and EU-OSHA, 2014). Despite national and international surveillance systems across European countries including the United Kingdom (UK) and Ireland, the implementation of measures to address Psychosocial risk factors is sub-optimal. The debate is still unresolved on whether these issues should be regulated by “soft law” (as currently done) or “hard law” (legally binding regulations). Furthermore, studies have identified issues with the application of Framework Directive 89/391/EEC, which covers psychosocial risk factors indirectly; it does not specify the ideal outcomes, what would be expected for organisations to achieve, nor clearly translate its guidance into practice (Iavicoli *et al.*, 2011; Leka *et al.*, 2011b). Hence, it does not seem to be successful in promoting the correct management of psychosocial risk factors nor addressing work related stress efficiently. Consequently, psychosocial risk factors continue to often be seen as issues of low priority (Ertel *et al.*, 2010; Iavicoli *et al.*, 2011; Leka *et al.*,

2011b; Iavicoli *et al.*, 2014). While the discussion on these legal frameworks is still ongoing, the importance of “soft law” in shaping and driving or compelling “hard law” has been acknowledged (Leka *et al.*, 2011b; Iavicoli *et al.*, 2014; Leka *et al.*, 2015)

Iavicoli *et al.* (2011) also highlighted the legal gap where Psychosocial risk factors are not clearly addressed as hazards or risk factors in national legislation. OHS regulations in the UK and Ireland lack clarity and definition as they state that employers must ensure “as far as reasonably practicable” that the health and safety of workers is not endangered or put at risk in the course of their work (UK Parliament and Queen of England, 1974; Houses of the Oireachtas, 2005). Guidance and advisory resources are available (British Standards Institution, 2011; Health and Safety Authority, 2011) but do not clearly establish clear responsibilities and duties for employers (and employees) and OHS practitioners. This leads to poor implementation of preventative and risk management measures for Psychosocial risk factors (Ertel *et al.*, 2010; Eurofound and EU-OSHA, 2014; Iavicoli *et al.*, 2014) in addition to reduced follow-up and limited contribution from regulatory agencies (such as OHS inspectorates) (Johnstone *et al.*, 2011).

The HSP as the frontline professional for the management of OHS in an organisation is also a key stakeholder in the implementation of psychosocial, organisational and health promotion measures in the workplace. Authors have also argued that the HSPs role goes beyond the guidance and inspection of workers’ activities (Blair, 2003; Jones, 2005). It has been also suggested that these professionals should hold the knowledge and technical competences to be

a guiding agent to influence the organisation, its leaders and line managers in establishing and implementing a Safety Culture which will lead to safety practices and performance in the company (Blair, 2003).

This study aims to investigate the HSPs' tasks and specifically their involvement in activities to assess and manage Psychosocial risk factors, Safety Culture and Health Promotion within their organisations. We will provide an overview of the current tasks performed by HSPs in the UK and Ireland with a focus on Psychosocial, Safety Culture and Health Promotion and tasks (objective 1). Organisational characteristics of the workplace and characteristics of the HSP's job will be compared for the practitioners involved in these types of tasks and those who are not (objective 2). Additionally, organisational predictors of engagement in Psychosocial, Health Promotion and Safety Culture activities will be determined (objective 3).

2. Methods

This cross-sectional study included HSPs from the Republic of Ireland and the UK who were invited to complete a web-survey. Ethical approval was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospitals, Ireland. In April of 2014, an email invitation was sent to 38,911 members of the Institution of Occupational Safety and Health (IOSH) with a link to the survey. IOSH is the largest international professional body for HSPs. Data was collected until June 2014.

The invitation was not sent to IOSH members who were retired, working in academic institutions (not as practitioners), students or those qualified but not working in the area of OHS. A filter question screened out those HSPs who were

not directly employed in a company nor working internally in OHS. With the cross-sectional nature of this study in mind, it was considered that the work of those involved in transient projects or temporary tasks would change over the time period of this research and hence would not be properly captured. Thus, to avoid introducing an additional layer of complexity to the study, professionals in a consultancy or inspectorate position were excluded. HSPs working internally in a company were included as their jobs and tasks were deemed not to be of a transient or changeable nature.

2.1. Data Collection Instrument and Measures

The questionnaire included demographic questions (age; years at work; gender; education; job title amongst others) adapted from Jones (2005). Questions on the organisational structure of the OHS department in the company were based on the questionnaire by Hale *et al.* (2005). Enterprises were categorised by company size according to the number of employees as established in the European Regulations (The Commission of the European Communities, 2003). The sectors of activity were categorised according to the Office for National Statistics in the UK (Department of Finance and Personnel, 2014) and Central Statistics Office in Ireland. These were then aggregated into ten categories considering the similarity of the health and safety environments. Categories “other” and “not specified” in the variables “Sector of Activity” and “Job Title” were excluded from the inferential analysis.

The questionnaire also presented a list of tasks commonly carried out by HSPs across Europe adapted from Hale *et al.* (2005). Considering the changing nature and demands of the OHS profession, only the core items of Hale’s survey were

included and further items were added reflecting emerging areas of work and responsibility for HSPs. Individuals were asked to select the frequency with which they performed each task (Weekly or more; Monthly; Yearly or less; Never yet but it is part of my job; It is not part of my job). The questionnaire was piloted with HSPs prior to its wider distribution.

Although the questionnaire included a variety of activities carried out by HSP's, this study focussed on three main groups of tasks: Psychosocial risk factors assessment and management, Health Promotion and Safety Culture. Tasks concerning management of Psychosocial risk factors (Develop a programme of psychosocial prevention measures; Implement a programme of Psychosocial prevention measures; Develop a programme of psychosocial risk assessment – 3 items) were grouped into a dichotomous variable “Psychosocial Tasks” – “Yes” performs one or more of these tasks or “No” has not performed this task yet, or this task is not part of the respondent's job. The same procedure was applied for the four items relating to “Health Promotion” (Design health promotion or safety training programmes, courses or workshops; Give health promotion training programmes, courses or workshops; Design a health promotion campaign; Implement a health promotion campaign) and “Safety Culture” (2 tasks: prepare and assess company policy on safety culture).

2.2. Data analysis

Cross-tabulation and chi square tests were performed to study the association between each of the three groups of tasks and the diverse characteristics of the organisation (regarding the location, sector of activity and size of the

organisation where each HSPs was working) and of the HSPs' job (their job title, working part/full-time and working within a OHS team).

This association was further explored through logistic regression modelling, to understand the independent contribution of characteristics of the organisation and of the HSPs job to each group of tasks. The 3 groups of tasks served as dichotomous outcome variables (yes=1/no=0) for the models (Psychosocial tasks, Health Promotion tasks, Safety culture tasks). Each model included activity sector, job title, company size, country, other HSPs in the company (grouped into "No other"; "1 other HSP"; "2 to 10 more HSPs"; "11 or more HSPs") and HSP job part-time or full-time. Other variables such as gender, seniority and having HSP responsibilities in more than one site, were initially included in the models. However, as these were not significant nor contributed substantially to the model fit, they were not included in the final regression models. The model fit was determined through the goodness of fit test using the chi-Square value from Omnibus Tests of Model Coefficients. All analyses were carried out with IBM SPSS Statistics 22.

3. Results

A total of 1444 completed questionnaires were obtained (3.7% response rate). However, 159 respondents were not employed as HSPs internally by a company and hence were not eligible to finish the questionnaire. Further respondents were excluded since they did not work in Ireland nor the UK or due to a large number of incomplete questions, leading to a final sample of 879 participants (2.26% response of eligible respondents).

The study population comprised 95.73% practitioners from the UK and 79% males. The sample obtained was similar to this population with 91.5% respondents from the UK and 76.5% male individuals. Additionally, the participants' activity sectors were proportionally similar to the figures reported for IOSH members (IOSH, 2012) as shown in table 1.

As shown in table 2, the majority of respondents were male (76.5%) and full-time (89%) practitioners from the UK (91.5%) with an average age of 49 years (SD 9.3). The largest proportion of participants worked in administrative and support services, education and professional technical or scientific work (21.4%). Manufacturing was the second main activity sector with 21% of participants from this area.

The most common job title group was "Manager, Director, Head, Lead(er) or Coordinator" (51%). Of the participating HSPs, 42.5% had between 11 and 20 years of experience and 37.8% had 4 to 10 years of experience.

Figure 1 gives an overview of the tasks performed by HSPs (objective 1). Activities relating to Psychosocial risk factors, selection of staff and Health Promotion-related tasks were performed least often by HSPs. Conversely, activities more closely linked to assessment and management of safety risks and hazards and safety compliance were performed the most by participants (i.e., keep statistics about accidents and incidents, investigate and evaluate workplace risks, inform/discuss with stakeholders about possible risks and measures).

Table 3 displays the results for the three groups of tasks (psychosocial, health promotion, safety climate) and their distribution per characteristic of the organisation and of the HSPs' job, with chi-square statistics (objective 2). The tasks related to Psychosocial risk factors were performed least often by HSPs (30.8%), whereas a higher proportion of these practitioners carried out Health Promotion-related tasks (64.2%) and the vast majority executed tasks linked to Safety Culture (86.8%).

Health promotion activities varied significantly by activity sector ($\chi^2=23.793$, $p<.01$) and job title ($\chi^2=17.311$, $p<.01$). Involvement in Safety Culture tasks varied by job title ($\chi^2=20.429$, $p<.01$), having other HSPs in the company ($\chi^2=9.499$, $p<.05$) and working part-time or full-time as HSP ($\chi^2=20.395$, $p<.01$).

The percentage of HSPs performing the studied group tasks was the highest in the "Mining/quarrying, agriculture & forestry/fishing" sector. Conversely, the proportion of HSPs performing Psychosocial or Safety Culture-related tasks was the lowest in the area of "Construction" and "Hospitality and entertainment/recreation". The lowest percentage of HSPs carrying out Health Promotion tasks was recorded for the "Public Administration & Defence" sector, together with "Health & social work" and "Admin. & service and Professional Tech. Scientific".

A slightly higher proportion of professionals in a management position performed Health Promotion and Safety Culture-related tasks (70.5% and 91.3% respectively). For Safety Culture-related tasks, the proportion of HSPs involved in these working without other HSPs in the company involved in Safety (92.5%), and working full time (88.6%) was somewhat higher.

The findings from the logistic regression modelling (table 4) showed that some of the variables were statistically significant predictors of the HSPs engagement in Psychosocial, Health Promotion and Safety Culture activities while controlling for all other included factors. HSPs working in the “Mining/quarrying, agriculture and forestry/fishing” (adjusted OR= 2.496; CI 1.083- 5.755) or “Electric/Gas supply and Water/waste/sewage” (adjusted OR=2.859; CI 1.428-5.725) activity sector, were more likely to carry out activities in the area of Psychosocial risk factors when compared to the reference group “Construction”.

In what concerns health promotion tasks, HSPs working in “Health & social work” (adjusted OR = 0.339; CI 0.156-0.737) had the lowest likelihood to perform these. HSPs with an “advisor” role were also less likely to execute these tasks (OR=0.510; CI 0.345-0.754).

For Safety Culture-related activities, HSPs in “Electric/Gas supply and Water/waste/sewage” (adjusted OR=3.304; CI 1.055-10.345) had the highest probability of performing these. Practitioners with an “Officer” (adjusted OR=0.428; CI 0.235-0.780) or “HS Practitioner or specialist” (adjusted OR= 0.381; CI 0.201-0.723) job title were less likely to take part in these tasks. Similarly, HSPs working part-time (adjusted OR=0.368; CI 0.203-0.669) or with two or more colleagues in their company (adjusted OR=0.306; CI 0.152- 0. 615), had a lower probability of performing Safety Culture-related tasks.

4. Discussion

The aim of this study was to describe the specific tasks of HSPs regarding the management of Psychosocial risk factors, Health Promotion and the

management of Safety Culture and their patterns according to organisation type and characteristics of the HSP job.

The results showed that tasks regarding Psychosocial risk factors or prevention measures were not addressed frequently by HSPs, nor included in their work responsibilities. This was also observed by Hale and Guldenmund (2006).

A decade has passed since Hale *et al.* (2005) observed that the main set of tasks for HSPs in Europe were linked to technical and mechanical hazards, stemming from the origins of the safety profession. Our finding showed that this still seems to be the case for the HSPs in Ireland and the UK.

We observed that a considerable proportion of organisations were including Health Promotion into their OHS management. Approximately a third of HSPs were involved in activities linked to HP. This may, indirectly, address psychosocial risk factors and their health impact, leading to an improvement in some of the related issues. For instance, as exercise has been linked to a reduction in the levels of stress or its consequences on health and wellbeing (Fox, 1999; Taylor, 2000; Moraska and Fleshner, 2001; Salmon, 2001; Michie and Williams, 2003; Hamer *et al.*, 2012), companies promoting physical activity amongst their employees might contribute to the reduction or better management of experienced stress. However, HP programmes usually deal with behaviours or outcomes and consequences of psychosocial risk factors instead of addressing their causes in the work environment.

The management of Safety Culture showed to be an area well-established among the organisations in the current study. These findings are in line with Hale *et al.* (2005). Curiously, the low proportion of HSPs working in

Psychosocial-related activities may indicate that Psychosocial risk factors are not considered an intrinsic part of a strong Safety Culture. A greater focus seems to be given to behavioural and physical aspects of safety, overlooking risks with long latency, unpredictability or invisibility, as is the case for psychosocial risks (Blewett, 2011).

4.1. Characteristics of the organisation and of the HSPs' job as predictors for the engagement of HSPs in activities concerning Psychosocial risk factors, Health Promotion and Safety Culture

Objective 2 addressed the variation of the three task groups by the characteristics of the organisation and of the HSPs' job. It was interesting to notice that HSPs employed in the public sector (i.e. "Public Administration & Defence", "Electric/Gas Supply and Water/Waste/Sewage", "Administration & Services and Professional Technical Scientific") had a higher probability of being involved in OHS activities related to Psychosocial risk factors, HP and Safety Culture. This may indicate that governmental and public organisations hold a stronger (although with potential for improvement) position regarding these three areas of OHS. Although sector-specific results concerning implementation of psychosocial measures are not yet available for ESENER2, our findings are in line with those from ESENER (EU-OSHA, 2009a; vanStolk *et al.*, 2012). Furthermore, ESENER (vanStolk *et al.*, 2012) has also shown that the area of management of Psychosocial risk factors still required further attention in European enterprises as approximately 12% of organisations did not implement any measures to address this. Interestingly, Ireland and the UK showed similar values for the average number of psychosocial risk factors

management measures implemented by their organisations in ESENER (vanStolk *et al.*, 2012).

The study also highlighted sectors with low HSP involvement in psychosocial risk factors assessment and management. Organisations within the “Construction” sector showed greater potential (and need) for improvement regarding Psychosocial risk factors, in line with data from ESENER (vanStolk *et al.*, 2012). Similarly, as also observed in ESENER (vanStolk *et al.*, 2012), “retail and wholesale”, “hospitality” and “manufacturing” are among the activity sectors with less engagement in activities of management of Psychosocial risk factors.

Furthermore, the findings for the sector “Health and Social Work” were somewhat disquieting. Although ESENER2 showed that this is one of the sectors most affected by psychosocial risk factors in Europe (European Agency for Safety and Health at Work (EU-OSHA), 2015), this sector presented one of the lowest proportions of performed tasks executed by the HSPs concerning work-related Psychosocial risk factors and HP. This is contrary to the ESENER study findings which showed this sector as one of the ‘best performers’ in the European data. Our results for Irish and British HSPs seem paradoxical as this is the sector involved in professionally managing health and wellbeing in patients. However, this sector underwent dramatic restructuring in the previous years with drastic cuts in funding in both countries that may have resulted in reduced investment for the prevention of Psychosocial risk factors and the implementation of health promotion measures. Although tasks concerning HP and Psychosocial risk factors for staff could be performed by

healthcare staff or other personnel, these areas should be addressed in a concerted effort with the OHS team.

Although several aspects might contribute to this scenario, it is plausible to assert that, in a time of economic recession, restructuring (especially in the public sector) and of reduction or relocation of resources, the priorities of an organisation are mainly set by the demands of compliance and law enforcement, as shown by ESENER (EU-OSHA, 2009a; European Agency for Safety and Health at Work (EU-OSHA), 2015). As previously mentioned, the current legal framework, has greater focus and specificity on the physical aspects of OHS, leaving a certain ambiguity in what concerns the requirements and practices for the adequate management of psychosocial risk-factors. Hence, there seems to be a general lack of awareness and/or understanding from practitioners, managers and workers in what concerns this area (Iavicoli *et al.*, 2011; Leka *et al.*, 2011b; Leka *et al.*, 2015). Additionally, enforcement of the framework directive regarding psychosocial risk factors and work-related stress does not seem to be part of the priorities or enforcement programmes at national and local level, particularly in what concerns the UK and Ireland (Health and Safety Authority, 2014a; 2015; Health and Safety Executive UK, 2015). Hence, it is not surprising that Psychosocial risk factors are not, overall, an active nor significant part of the HSPs job.

Similar to Jones (2005), the majority of HSPs performing tasks regarding the three groups studied held a managerial position. This may indicate that Psychosocial and HP tasks are essentially seen as strategic activities which are used to raise the morale or engagement of the workforce (in the interest of

production and productivity), but also as a requirement for compliance with policies or to satisfy conventions (regulations and guidelines from national authorities (British Standards Institution, 2011; Health and Safety Authority, 2011)).

Working with other HSPs in the organisation, possibly indicative of the company size but also of the presence of a multi-disciplinary OSH team, was not a significant aspect for the HSPs' involvement in Psychosocial or HP tasks. In the specific case of Safety Culture-related tasks, practitioners who worked with other HSPs were less likely to engage in these activities.

Objective 3 addressed the independent characteristics of the organisation and the work as predictors of HSPs involvement in the three task groups. The regression model could not be adequately fitted for the psychosocial tasks. This indicates that the characteristics of the organisation and of the job that were studied were not able to explain the variation in the HSPs' level of involvement in activities related to Psychosocial risk factors. Although this may be due to low statistical power, it might also indicate that the HSPs involvement in actions regarding Psychosocial risk factors is determined by factors not addressed in this study.

The predictors for HP and Safety Culture-related tasks mainly confirmed the patterns found in objective 2, with sector of activity and job title significantly and independently predicting the performance of these tasks by HSPs. HSPs in managerial positions were more likely to execute these activities independent of sector and company size. Finally, contrary to previous studies (European Agency for Safety and Health at Work (EU-OSHA), 2015; Leka *et al.*, 2015),

company size was not a significant predictor of the performance of these tasks by HSPs. Differences were, however, found in the likelihood of HSPs participation in these group of activities according to their activity sector.

The findings presented hitherto can indicate that risk assessment and management of psychosocial risk factors are generally not a priority for organisations, nor the general management of OHS, as previously observed by various authors (Dollard *et al.*, 2007; Leka and Kortum, 2008; Ertel *et al.*, 2010; Iavicoli *et al.*, 2011; Leka *et al.*, 2015). The figures on the low involvement of HSPs in Psychosocial-related tasks do not necessarily indicate that these activities are not performed at all in the organisation as they might be executed by other professionals in the company. However, this indicates that HSPs are not fully included in the management of the organisation's OHS and workers' health and wellbeing.

The higher involvement of management in these tasks might denote a tendency for delegation of the operative tasks to contracted external services without further involvement of internal HSPs at officer or adviser level (e.g. external consultants for psychosocial risk assessment or Employees Assistance Programmes to deliver counselling services). In this way, compliance may be achieved by establishing policies and procedures. However, if HSPs are not included at all levels of psychosocial OHS, the causal factors of the psychosocial outcomes may not be identified and/or interventions and tailored preventative measures may not be implemented within the workplace.

Strong and clear surveillance systems that are applicable and adaptable to the diverse and ever-changing work environments are essential (Dollard *et al.*,

2007; Leka *et al.*, 2015). However, these systems also need to focus on specific priorities, offering a structured follow-up so that required measures are applied ensuring a continuous improvement system. As stated by Dollard *et al.* (2007), long term sustainable and effective solutions require initiatives at this higher and wider level that can be transferred and applied in organisations in a clear and systematic manner.

There is no single solution with regard to managing psychosocial risk factors, but many effective approaches have been implemented in organisations across Europe (Eurofound and EU-OSHA, 2014).

4.2. Limitations and future research

This research is one of the few studies that systematically addresses the role and tasks of HSP across different industry sectors, specifically their role in Psychosocial risk management, Health Promotion and Safety Culture. Since there is no official registration for HSPs in UK or Ireland, recruiting these professionals for this research offered specific challenges, particularly in reaching practitioners from diverse organisations across a wide geographical area. Sampling was performed through the professional body IOSH. Most OSH practitioners hold membership in IOSH, therefore we feel confident that our sampling frame provided a good basis for a representative sample. However, selection bias may have affected the results; hence a non-response analysis was performed to address this. Although the response rate for this study was low, there was a large sample size with respondents showing a distribution, per gender and sector of activity, comparable to that of IOSH members for 2012 and to the data from the UK statistics on registered business per sector for 2014

(Department of Finance and Personnel, 2014; Office for National Statistics, 2014). Irish national data provided by the Central Statistics Office on these sectors of activity is aggregated differently; hence the comparison was not possible for this country. Considering this, and as the majority of our sample was working in the UK, we believe that this group is representative of its population. To minimise measurement bias, pre-validated and piloted questionnaires were used.

This was mainly a descriptive cross-sectional study. Further research needs to look into the causal factors that may determine whether the HSP is involved in the management of Psychosocial risk factors. The current research provides information regarding organisations from different sectors of activity and of various sizes of company. Due to the large geographical distribution of the sample, self-reported outcomes were used in this study. However, the potential effect of recall bias or social-desirability cannot be excluded. This study focusses particularly on the activity of HSPs with an internal position in an organisation. While health and safety consultants or inspectors might be involved in the tasks explored here, the transient nature of this involvement resulted in their exclusion from this study. Therefore, this group is beyond the remit of this research and further studies are needed to inform this area.

Additionally, although modest, there is a possible interference of “healthy worker effect” as the survey availability (email address) could not be controlled for. Hence, if the work email address was used, HSPs on prolonged sick leave might not have received the web-survey invitation.

Although this study provides insight into the HSPs' work and their involvement in specific tasks, plenty still needs to be learned about these practitioners' activity and role. Research is still needed that clearly identifies the main barriers in implementing measures for management and prevention of Psychosocial risk factors and the best and most efficient solutions to tackle them. These studies should also focus on each activity sector and company type to clarify whether tailored solutions need to be developed. Intervention studies and qualitative research providing evidence on favourable OHS outcomes stemming from the implementation of measures for management of psychosocial risk factors in conjunction with HP activities are also required.

4.3. Conclusion

Our findings showed that HSPs are, to a very small degree, included in the management and assessment of Psychosocial risk factors, to a moderate degree in HP activities and to a large degree in the management of safety culture in organisations. The lack of involvement in assessment and management of psychosocial risk factors, in particular, may create difficulties in ensuring a holistic and multidisciplinary approach in managing OHS that takes the challenges of the modern workplace hazards into account (Vezina et al., 2004; ILO, 2012). To achieve a balance between behavioural, physical and psychosocial OHS measures, it may be beneficial to make employers and employees more aware of the benefits of a strong psychosocial work environment as an integral part of Safety Culture (Danna and Griffin, 1999; Wilson *et al.*, 2004)

The discussion on whether the assessment and management of psychosocial risk factors should be bound by a “hard law” (which makes these mandatory aspects to deal with), rather than a “soft law” (such as guidelines, codes of conduct and similar types of documents) is still ongoing. The current study seems to be in line with previous research which reported that the implementation of the EU Framework on psychosocial risks and work-related stress is still widely unsatisfactory (Ertel *et al.*, 2010; Leka *et al.*, 2010; Iavicoli *et al.*, 2011; Johnstone *et al.*, 2011; EU-OSHA, 2015). The ESENER2 study (2015) showed that legal obligations are still the main driver for organisations’ management of OHS and psychosocial risk factors. Thus, it is plausible to infer that aspects not explicitly addressed in the law, or for which a practical operationalization is not provided - such as the psychosocial risk factors - are not a priority for enterprises.

According to the risk management approach to work-related psychosocial risk factors - embraced by the Health and Safety Authority in Ireland and the Health and Safety Executive in the UK - it is important that a preventative culture is adopted, which considers risk assessment and management of psychosocial risk factors a priority and an integrative part of OHS (Leka *et al.*, 2015). Workplace psychosocial OHS programs should include a primary prevention component with a view to eliminating or reducing the psychosocial (or organisational) source of issues (Vezina *et al.*, 2004). This would involve a greater inclusion of HSPs in the management of OHS tasks related to psychosocial risk factors and Health Promotion.

The need to train and efficiently prepare HSPs to address and manage the new emerging hazards in the workplace, psychosocial risk factors, mental health issues, work-related stress and health and prevention services has been recognised (Leka *et al.*, 2008; Iavicoli *et al.*, 2011). Professional organisations are now working on updates of the role definition and skills set of this profession. Efforts are also being focused on the development of a Global OHS Competency Framework as an international standard for HSPs, to facilitate a shared understanding of the role of the HSPs as a key advisor, strategist and leader in the management of OHS risk integrated within sustainable business practice (INSHPPO - International Network of Safety & Health Practitioner Organisations, 2015).

If both practitioners and higher management fully embrace the importance of a concerted and combined effort perhaps a more universal implementation of this approach can be achieved which can lead, in the long term, to capital gains and great human benefits.

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Table 4.1 – HSPs sector of activity – Comparison of study sample with IOSH study population of employed HSPs

Sector	Employed HSPs (2012)*	Sample
Transportation/storage and Wholesale/retail	7%	8.6%
Manufacturing	18%	21.0%
Construction	19%	15.2%
Health and social work	5%	4.9%
Public Administration & Defence	14%	14.2%

* Data from IOSH salary survey (IOSH, 2012)

Table 4.2 – Sample Characteristics

	N	%
Total	879	100
Gender		
Male	672	76.5
Female	207	23.5
Part-time or Full-time		
Part-time	97	11
Full-time	782	89
Country of Work		
United Kingdom	804	91.5
Ireland	64	7.3
Not specified	10	1.1
Sector of Activity		
Admin. & Services and Professional Tech.	188	21.4
Scientific		
Manufacturing	185	21.0
Construction	134	15.2
Public Administration and Defence	125	14.2
Transportation/storage and Wholesale/retail	76	8.6
Elect./Gas supply and Water/waste/sewage	53	6.0
Health and social work	43	4.9
Agriculture, forestry/fishing, mining/quarrying	32	3.6
Hospitality & entertainment/recreation	24	2.7
Other	19	2.2
Job title		
Manager, Director, Head, Lead, Coordinator	448	51.0
HS Advisor	169	19.2
HS Officer	135	15.4
HS Practitioner or specialist	89	10.1
Other	18	2.0
Not specified	20	2.3
Seniority (years working as HSP)		
0-3 years	57	6.5
4-10 years	332	37.8
11-20 years	374	42.5
21 or more years	116	13.2
Age		
Younger than 30 years	29	3.3
31-45 years	278	31.6
46-55 years	357	40.6
56 or older	215	24.5

Figure 4.1 – Frequency with which tasks were performed by Health and Safety Practitioners (%)
(PSYCH – Psychosocial tasks; HP – Health Promotion tasks; SC – Safety Culture tasks)

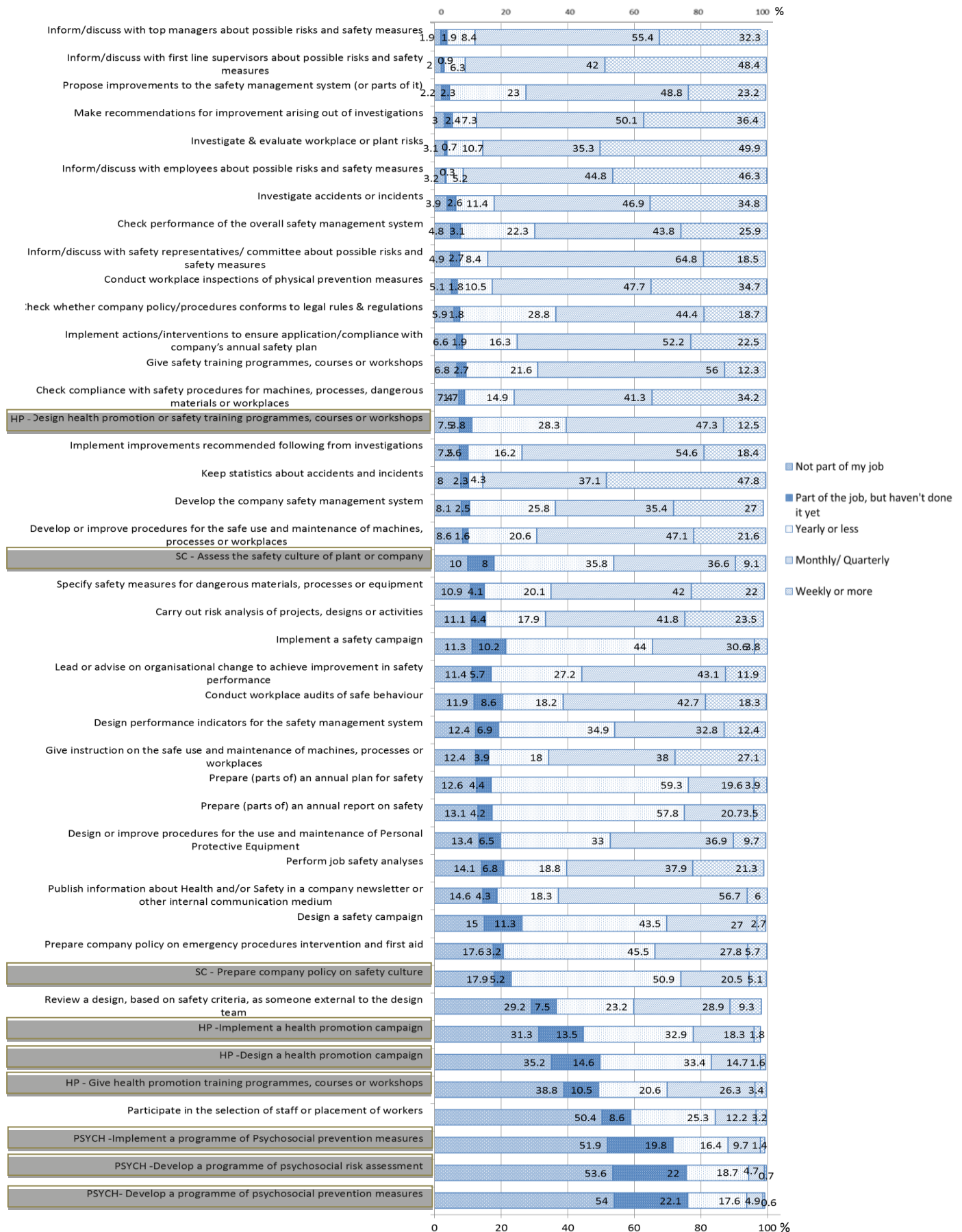


Table 4.3 – Chi-Square statistics for HSPs performance of each of the three grouped tasks within each characteristic of the organisation and of the HSP job.

	Psychosocial Tasks			Health Promotion Tasks			Safety Culture Tasks		
		n	%		N	%		n	%
Total HSPs performing these tasks		271	30.8		564	64.2		763	86.8
Activity Sector									
	χ^2	12.69		23.793**			12.061		
Mining/quarrying, agriculture and forestry/fishing		14	43.8		27	84.4		29	90.6
Manufacturing		55	29.7		123	66.5		169	91.4
Hospitality and entertainment/recreation		6	25.0		15	62.5		19	79.2
Transportation, storage & wholesale, retail		27	35.5		53	69.7		65	85.5
Health & social work		14	32.6		21	48.8		39	90.7
Elect./Gas supply and Water/waste/sewage		23	43.4		35	66.0		49	92.5
Admin. & services and Professional Tech. Scientific		55	29.3		108	57.4		158	84.0
Public Administration & Defence		41	32.8		71	56.8		110	88.0
Construction		30	22.4		99	73.9		109	81.3

(* p<.05; **p<.01)

Table 4.3 (Cont.) – Chi-Square statistics for HSPs performance of each of the three grouped tasks within each characteristic of the organisation and of the HSP job.

		Psychosocial Tasks		Health Promotion Tasks		Safety Culture Tasks			
			n	%		n	%		
Job Title	χ^2	1.167			17.311**		20.429**		
Manager, Director, Head, Lead, Coordinator			146	32.6		316	70.5	409	91.3
HS Advisor			52	30.8		90	53.3	146	86.4
HS Officer			38	28.1		83	61.5	112	83.0
HS Practitioner or specialist			26	29.2		55	61.8	67	75.3
Company Size	χ^2	.819			3.029		2.082		
SME (<250 employees)			78	28.8		173	63.8	229	84.5
Large (<1000 employees)			87	31.3		189	68.0	242	87.1
Enterprise (More than 1000 employees)			106	32.1		202	61.2	292	88.5
Country	χ^2	.482			1.125		1.731		
United Kingdom			243	30.2		518	64.4	700	87.1
Ireland			22	34.4		37	57.8	52	81.2

Table 4.3 (Cont.) – Chi-Square statistics for HSPs performance of each of the three grouped tasks within each characteristic of the organisation and of the HSP job.

	Psychosocial Tasks			Health Promotion Tasks			Safety Culture Tasks		
		n	%		N	%		n	%
Other HSPs in the company									
χ^2	4.651			3.522			9.499*		
No other		61	26.8		143	62.7		211	92.5
1 other HSPs		46	35.9		90	70.3		111	86.7
2 to 10 more HSPs		111	33.0		218	64.9		282	83.9
11 or more HSPs		53	28.3		113	60.4		159	85.0
HSP job part-time / full-time									
χ^2	.000			3.421			20.395**		
Full-time		241	30.8		510	65.2		693	88.6
Part-time		30	30.9		54	55.7		70	72.2

(* p<.05; **p<.01)

Table 4.4 – Logistic Regression analysis of psychosocial tasks with characteristic of the organisation and of the HSP job.

	Psychosocial Tasks			Health Promotion Tasks			Safety Culture Tasks		
	Adj.	C.I.		Adj.	C.I.		Adj.	C.I.	
	OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper
	p>.05			p<.05			p<.05		
Activity Sector (Ref. Construction)									
Mining/quarrying, agriculture and forestry/fishing	2.496	1.083	5.755	1.693	.593	4.834	2.152	.580	7.987
Manufacturing	1.520	.891	2.592	.696	.414	1.167	2.995	1.398	6.417
Hospitality and entertainment/recreation	1.181	.421	3.309	.610	.238	1.566	.809	.252	2.603
Transportation, storage& wholesale, retail	1.884	.987	3.594	.842	.434	1.636	1.280	.554	2.955
Health & social work	1.710	.758	3.860	.339	.156	.737	2.584	.753	8.869
Elect./Gas supply and Water/waste/sewage	2.859	1.428	5.725	.655	.323	1.326	3.304	1.055	10.345
Admin. & services and Professional Tech. Scientific	1.276	.723	2.254	.438	.256	.748	1.234	.631	2.414
Public Administration & Defence	1.635	.882	3.033	.511	.282	.923	2.280	1.022	5.083
Job Titles (ref Manager, Director, Head, Lead, Coordinator)									
HS Advisor	.888	.589	1.340	.510	.345	.754	.610	.338	1.100
HS Officer	.742	.473	1.164	.705	.460	1.081	.428	.235	.780
HS Practitioner or specialist	.819	.484	1.386	.768	.463	1.274	.381	.201	.723

(Model Fit: Psychosocial Tasks $\chi^2 = 20.55$; $p = .303$; Health Promotion $\chi^2 = 45.82$; $p = .000$; Safety Culture $\chi^2 = 57.01$; $p = .000$)

Table 4.4 (Cont.) – Logistic Regression analysis of psychosocial tasks with characteristic of the organisation and of the HSP job.

	Psychosocial Tasks			Health Promotion Tasks			Safety Culture Tasks		
	Adj.	C.I.		Adj.	C.I.		Adj.	C.I.	
	OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper
Company Size (Ref Enterprise (More than 1000 employees))		p>.05			p>.05			p>.05	
SME (<250 employees)	.935	.589	1.485	.942	.601	1.475	.597	.320	1.114
Large (<1000 employees)	.993	.675	1.462	1.233	.841	1.808	.920	.529	1.600
Country (Ref United Kingdom)		p>.05			p>.05				
Ireland	1.357	.755	2.441	.760	.424	1.360	1.102	.479	2.531
Other HSPs in Company (ref No other)		p>.05			p>.05			p<.01	
1 other HSPs	1.590	.964	2.623	1.592	.961	2.638	.521	.232	1.169
2 to 10 more HSPs	1.345	.866	2.090	1.297	.847	1.986	.306	.152	.615
11 or more HSPs	1.065	.636	1.784	.889	.545	1.450	.292	.135	.631
HSP Full-time vs Part-time (Ref Full-time)		p>.05			p>.05			p<.01	
Part-time	1.058	.633	1.770	.870	.534	1.419	.368	.203	.669

(Model Fit: Psychosocial Tasks $\chi^2 = 20.55$; $p = .303$; Health Promotion $\chi^2 = 45.82$; $p = .000$; Safety Culture $\chi^2 = 57.01$; $p = .000$)

Chapter 5 – Paper 4: Safety and Health Climate and Job Demand-Control-Support – the link with Health and Safety Practitioners

Safety and Health Climate and Job Demand-Control-Support – the link with Health and Safety Practitioners

Abstract

Background/Aims: Health and Safety Practitioners (HSPs), as frontline professionals advocating for the health and safety conditions at work, have a pivotal role in the wellbeing of employees. Safety climate (SC) and Health Climate (HC) have been recognised as an important element for the health and safety of an organisation and its workers with provision of a safety manager on site, resulting in a better safety climate. Research has shown the association of SC and HC with psychosocial strain and the way this affects workers. Therefore, SC, HC and job demands, control and support (JDCS) can be influential for HSPs' health. The current study aims to explore the link of SC, HC and JDCS with HSPs' wellbeing and efficacy.

Methods: Data were collected from 1444 HSPs in Ireland and the UK through a web-survey. Validated questionnaires investigating SC, HC and psychosocial work factors in addition to health outcomes and self-efficacy were completed. Multiple linear regression analysis was used to determine the association between SC and HC and health outcomes (general health and mental wellbeing) and self-efficacy.

Results: After adjusting for age, gender and years of experience, safety climate was significantly associated with general health ($\beta=-.17$; $p<0.01$), mental wellbeing ($\beta=0.25$; $p<0.01$), and work efficacy ($\beta=0.18$; $p<0.01$). Health climate and psychosocial work factors were also associated with all three outcomes.

JDCS showed a significant contribution to the association of SC and HC with GHQ12 scores and wellbeing levels. A consistent and substantial attenuation of the coefficients was observed for HC and SC and each of the three studied outcomes when entering demands, control and support into the respective models.

Conclusion: This study showed associations which have rarely been recorded previously. The demonstrated link of SC with HSPs work efficacy represents an additional impact of SC on an organisation's safety performance. The current findings indicate that, in a situation of low SC, it is the low levels of job control and support at work that affect the HSPs efficacy and not job demands. This highlights issues concerning psychosocial work factors for the HSPs which affect practitioners but also impact on OHS and, consequently, workers and stakeholders within organisations.

Keywords: Health and Safety Practitioners; Safety climate; Health Climate; Health outcomes; Job Demands-control-support; Work efficacy.

1. Introduction

Safety climate has been recognised as an important element for the occupational health and safety (OHS) of an organisation. This concept is known to be associated with safety outcomes, safety performance (Mearns *et al.*, 1998; Flin *et al.*, 2000) and safety behaviour (Hofmann and Stetzer, 1996; Cabrera and Isla, 1998; Tomas *et al.*, 1999; Brown *et al.*, 2000). Recent studies have also found an association between SC and efficacy (Larsson *et al.*, 2012; Bergheim *et al.*, 2013; Campbell, 2013). Self-efficacy refers to a professional's own sense of confidence or competence in the ability to successfully fulfil the tasks involved in his or her job (Wilson *et al.*, 2004; Rigotti *et al.*, 2008).

Although various scholars use the terms 'safety climate' and 'safety culture' interchangeably, these are two distinct constructs. Safety climate captures perceptions about what is actually done – it is thus a check on whether the behaviour of the people within the company, especially management and supervisors, matches the discourse (Shannon and Norman, 2008). Safety culture relates to the overall shared beliefs, values and traditions around workplace safety within the organisational systems. Therefore, safety culture is often the underlying or driving belief system that creates a climate (Guldenmund, 2000; Cooper and Phillips, 2004). Generally, safety climate is understood as employees' shared perceptions of the priority an organisation places on safety aspects that affect personal wellbeing at work such as safety policies, procedures and practices (Zohar and Luria, 2005; Christian *et al.*, 2009).

Considering this definition, SC should be, in general, measured at group level, as the perceptions of safety within one unit, team, department or one plant. However, Christian *et al.* (2009) also suggested the measurement of safety climate at individual level, where the assessment relates to each person's perception of safety in their work environment.

Similar to safety climate, health climate (HC) is understood as shared perceptions of an organization's priorities and practices relating to employee health. However, unlike SC, HC is more strongly related to features of the work environment linked to health promotion (Ilgen, 1990; Basen-Engquist *et al.*, 1998; Mearns *et al.*, 2010). Thus, organisations with positive HC are characterised by environments that encourage healthy lifestyles and promote individual wellbeing (Mearns *et al.*, 2010).

As the underlying factor in SC is the priority of safety (Zohar, 2003), for HC health is the priority (Mearns *et al.*, 2010). Although research is still scarce on the impact of health climate on OHS outcomes, Ribisl and Reischl (1993) have found that it is associated with health and wellbeing of workers, levels of job stress and satisfaction and social support. Numerous authors have also shown that companies with stronger levels of SC present lower accident and injury rates (Clarke, 2006b; Christian *et al.*, 2009; Clarke, 2010). The concepts of SC and HC shifted the focus on the origins of accidents and work-related illness from individuals and their behaviours to the way work and institutions are organised. This is in line with a strong body of research (North *et al.*, 1996; Tennant, 2001; Stansfeld and Candy, 2006a; Eatough *et al.*, 2012; Boschman *et*

al., 2013) which has demonstrated that the manner in which work is organised - in psychological and social terms - fundamentally affects workers' health and wellbeing (Cahill, 1996).

Karasek (1979), developed a model which conceptualises the impact of job demands and job control on the health and wellbeing of workers. Job demands refer to the intensity and speed of the work, where job control relates to workers' autonomy and ability to use and develop skills (Karasek *et al.*, 1998). The model suggests that the combination of high job demands and low job control are the key factors that together produce job strain, thereby increasing the risk of physical and mental illness (Laaksomen *et al.*, 2006). Additionally, research has shown that the support received from supervisors and colleagues often reduces the impact of demands on the worker and the lack of support at work can exacerbate the effects of low control (Johnson and Hall, 1988). Hence, social support was added as a dimension into this model which is now known as the Job demand control support (JDCS) model.

The JDCS model argues that the combination of high job demands with low job control (high-strain jobs) together with low levels of organizational support (iso-strain) will lead to harmful psychological and physiological consequences. Empirical data supported this premise showing the link between iso-strain and outcomes such as cardiovascular disease, musculoskeletal disorders, various mental health outcomes and absence from work (Marmot *et al.*, 1997; Van der Doef and Maes, 1999; De Lange *et al.*, 2003; Michelsen and Bildt, 2003; De Lange *et al.*, 2004; Gamperiene *et al.*, 2006; Hanson *et al.*, 2008; Hanson *et al.*, 2009;

Diène *et al.*, 2012). Taris *et al.* (2010) have also found an association between iso-strain and professional self-efficacy. Nevertheless, this model has been mainly applied in the context of occupational health research and has been scarcely utilised in the context of workplace safety research.

The health and safety practitioner (HSP) is one of the most fundamental professionals for the health and safety performance of an organisation and, consequently, the health and wellbeing of its workers. This frontline professional is responsible for ensuring safe and health-conducive working conditions, the promotion of health and wellbeing in the workplace and the prevention of incidents or accidents.

The association between the level of SC and the quality of psychosocial working conditions has been discussed rarely amongst scholars, especially the direction of this relationship and the role of the HSP are not clear. Does a good safety climate lead to the creation of a good psychosocial working environment or does a good psychosocial working environment shape the perception of a good safety climate? Research has shown that companies with higher safety climate are more likely to have the presence of a safety manager on site (or higher ranking safety officers) (Zohar, 1980; Smith and Wadsworth, 2009). The role and status of this professional in the company reflects on the priority of OHS in the organisation (Hale *et al.*, 2005) and hence, impacts on the level of SC perceived by employees (Zohar, 2003). However, considering the HSP has a significant role in shaping the organisation's SC, a cyclical effect might take place where HSPs work characteristics are influenced by the safety climate in

the organisation, and at the same time the HSP influences the safety climate. Additionally, Goldenhar *et al.* (2001) have shown that SC has an effect on the level of psychosocial strain experienced by professionals, thus this concept will also affect the wellbeing of the HSP.

Although research on the health and safety working conditions of the HSP is still scarce, it has been shown that psychosocial job characteristics (demands, autonomy, support) and organisational issues (pressures, authority) affect these practitioners more than physical hazards (Jones, 2005; Garrigou and Peissel-Cottenaz, 2008; Hovden *et al.*, 2008). Hence, both the concept of safety climate and the JDCS are relevant to characterise the working environment of the HSPs. Only few studies have used SC and the JDCS models together to investigate psychosocial working conditions (Gillen *et al.*, 2002; Snyder *et al.*, 2008; Phipps and Ashcroft, 2011; Phipps *et al.*, 2012) and showed that high job demands were inversely associated with SC whereas high job control holds a positive association with this concept. Workplaces with higher demands and lower control have a higher probability of showing low SC levels (Phipps and Ashcroft, 2011; Phipps *et al.*, 2012) with SC yielding higher scores for individuals perceiving greater support in the workplace (Gillen *et al.*, 2002). Nevertheless, scholars have recognised the need to investigate further the relationship of the JDCS dimensions with SC and the implications they might have to occupational health and safety (Gillen *et al.*, 2002; Snyder *et al.*, 2008; Phipps and Ashcroft, 2011; Phipps *et al.*, 2012). Similarly, the dearth of empirical evidence on HC and its role in workplace OHS indicates a need for further research in this area (Ribisl and Reischl, 1993; Mearns *et al.*, 2010).

The current study aims to explore the associations of safety climate and health climate with health, wellbeing and efficacy of HSPs while taking the working conditions of the HSP measured by JDCS into account. The following hypotheses were formulated:

Hypothesis 1: Safety climate and health climate are negatively associated with job demands but positively associated with job control and support of HSPs.

Safety climate and health climate are conceptualised as antecedents to job characteristics of HSPs. Organizations with low SC generally have more accidents and incidents, leading to a necessity for corrective measures. As the level of cooperation from the diverse stakeholders in the organisation might be low, more responsibilities and tasks fall on the HSPs culminating in a **higher level of demands** for these practitioners.

In a situation of low SC, it is assumed that health and safety is not a priority and, therefore, management support towards safety is generally low. This is usually reflected by poor support of the HSP position, resulting in low autonomy and/or authority in the organisation (**low support**). **Low job control** results from the increase in unexpected, unplanned events such as accidents or incidents and other possible damaging occurrences characteristic of these environments. Furthermore, in an organisation with low commitment to safety and with low HSPs' autonomy/authority, this professional might not have control over the safety practices and procedures implemented which are closely linked to their work.

Hypothesis 2: Safety climate and health climate are positively associated with health, wellbeing and efficacy of HSPs”.

The link between SC and the health and wellbeing of HSPs is plausible as, according to Snyder *et al.* (2008), “a positive safety climate suggests that the organization values employees on a personal level, supports their health and wellness, and chooses their safety over productivity when the two are at odds”. Hence, as employees, the HSPs health and wellbeing will also be affected by the level of SC and HC in the organisation.

Hypothesis 3: High demands, low control and low support are negatively associated with HSPs’ health, wellbeing and self-efficacy.

It is also assumed that job demands, control and support have a significant independent contribution to the association between safety climate/health climate with health, wellbeing and efficacy.

2. Methodology

This was a cross-sectional study involving HSPs from the Republic of Ireland and the UK who were invited to complete a web-survey. An email invitation was sent to 38,911 members of the Institute of Occupational Safety and Health (IOSH), with a link to the survey. Academics, students, retired or those qualified but not working in the area of OHS were excluded. Only HSPs directly employed in a company and working internally as HSP were asked to complete the questionnaire. These were selected through a filter question at the beginning of the questionnaire. Hence professionals in a consultancy or inspectorate position were not included. A reminder email was sent, two weeks before ending data

collection and participants were included in a draw for a prize as an incentive for participation in the survey. Ethical approval was obtained by the The Clinical Research Ethics Committee of the Cork Teaching Hospitals (CREC).

2.1. Data Collection Instrument and Measures

The survey had four sections with closed questions. In the first section, demographic questions adapted from Jones (2005), were asked (age; years at work; gender; education and work related questions). The organisational structure of the OHS department in the company and the main types of activities performed by the HSPs were also enquired as per Hale *et al.* (2005).

Organisational Safety Climate was assessed through the summary scale (16items) developed by Zohar and Luria (2005) and Health Climate assessed using the 5 items Health Climate scale (Basen-Engquist *et al.*, 1998).

Selected scales from the Job Content Questionnaire (Karasek, 1979; Karasek, 2004) were used to measure psychosocial and organisational aspects such as: job demands, job control, co-worker support (a total of 18 items). Supervisory-support items were not included in this analysis as a large proportion of HSPs work in a supervisory position.

Finally, the general health and mental wellbeing of the participants was assessed through the GHQ12 (Goldberg *et al.*, 1997) and the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) (Tennant *et al.*, 2007) respectively. Work efficacy was measured using the competence and impact

scales from the Empowerment Tool by Spreitzer (1995) as previously done by Wilson *et al.* (2004).

All scales were highly reliable with Cronbach's alpha values greater than 0.7 (Safety Climate: 0.96; Health Climate: 0.81; Efficacy: 0.88; Job control: 0.85; Job demands: 0.74; Co-worker support: 0.80; General Health (GHQ12): 0.92; Mental Wellbeing (WEMWBS): 0.94).

2.2. Data Analysis

Scores were obtained for the summary scales used for assessment of safety climate, health climate, job demands, control, co-worker support, general health, mental wellbeing and efficacy. As there was no normative national data for these scales and considering the level of skewedness in the data, the score obtained for each scale was compared to its threshold value (calculated by adding the highest and lowest possible value and dividing this by 2). Previous studies have used similar methods, establishing scales' thresholds based on its median (Chandola *et al.*, 2006a; Sparer *et al.*, 2013). However, for some of the current scales, the lowest value was above 0 and a median would not be an adequate reference point to use. Scores above the scale's threshold value were considered positive or strong values for this scale.

GHQ12 scores were used with Likert coding (0-1-2-3) and not the commonly used dichotomous coding as this offers a greater discriminatory power and higher detail on the health status of the sample. Similar methods have been used for the GHQ12 in work-related contexts (Lesage *et al.*, 2011) and epidemiologic research (Pevalin, 2000; Hankins, 2008). Higher scores of GHQ12

indicate a greater number of symptoms and, hence, a lower level of health. Missing values from items of the various scales were replaced with the mean value for that item as calculated for the sample when only 1 item per scale was missing. Cases where more than 1 item per scale was missing were excluded. Two interaction variables “Demands x Control” (job strain) and “Demands x Control x Support” (iso-strain) were created to include in the inferential analysis.

After adjusting for age, gender and seniority (years of practice as HSP) a set of hierarchical multiple regression models were performed to test our hypotheses: H1 – analysing the association of SC and HC’s with JDCS; H2 - ascertaining how much of the variance in health, wellbeing and efficacy of the HSP was explained by SC and HC; H3 - understanding how much of the variance in health and efficacy of the HSP could be explained by JDCS. Considering the non-normal distribution of the variables, the 95% confidence intervals for these regression models were analysed by applying the bootstrapping method with 1000 bootstrap samples and with bias-corrected confidence estimates (Hayes, 2009; Shrout and Bolger, 2002). Data were analysed using IBM SPSS Statistics (version 22).

3. Results

A total of 1444 completed questionnaires were obtained (3.7% response rate). However, 159 respondents were not employed as HSPs internally by a company and hence were not eligible to finish the questionnaire. Further respondents were excluded who did not work in Ireland nor the UK or had a large number of

incomplete questions. The final sample of 879 participants (2.26% response of eligible respondents) was used in the analysis.

Table 5.1 shows the sample characteristics. Over three quarters of the sample were male, from the UK and worked as full-time practitioners. The average age of the sample was 49 years (SD 9.3). Practitioners worked mainly in administrative and supportive services, education and professional technical or scientific work.

There were over 10 job titles used by respondents, which were grouped into similar clusters for analysis purpose. The most common job title group in the sample was “Manager, Director, Head, Lead(er) or Coordinator” (51%) followed by “H&S Advisor” (19.2%), “H&S Officer” (15.4%) and “H&S Practitioner or Specialist” (10.1%). Forty-two percent of HSPs had between 11 and 20 years in their role.

The descriptive statistics for the summary scales on organisational and psychosocial work factors as well as health, wellbeing and efficacy measures can be found in table 5.2. Overall, scales showed positive scores with the exception of job control and GHQ12 where average score were below the established threshold values.

Tables 5.3 to 5.6 show the results of the hierarchical multiple regressions performed. Testing hypothesis 1 and 2, SC ($\beta = -.05(.02)$; $p < 0.01$) and HC ($\beta = -.17(.06)$; $p < 0.01$) showed negative significant associations with job demands (table 3). Significant associations were also found between these two concepts and both job control ($\beta = .15(.01)$; $p < 0.01$ for SC; $\beta = .37(.05)$; $p < 0.01$ for HC) and

job support ($\beta=.07(.01)$; $p<0.01$ for SC; $\beta=.21(.02)$; $p<0.01$ for HC). Significant associations between SC, HC and health, mental wellbeing and efficacy (Hypothesis 2) are also shown on Table 5.3. An inverse significant association was found between SC, HC and GHQ12 scores, indicating higher levels of health and wellbeing with stronger SC ($\beta= -.17(.02)$; $p<0.01$) and HC scores ($\beta= -.40(.06)$; $p<0.01$) whereas a positive significant association was found between SC, HC and mental wellbeing and efficacy.

SC and HC were positively associated with better general health and wellbeing with SC explaining an additional 11% of the variance in GHQ12 scores after age, gender and seniority were controlled for. Similarly, SC explained an additional 12% and HC an additional 8% of the variance in scores of WEMWBS.

For hypothesis 3, table 5.4 shows a positive significant association between job demands and GHQ12 ($\beta=0.43(.04)$; $p<0.01$) indicating poorer general health with increasing work-related demands. Similarly, higher demands were associated with poorer mental wellbeing ($\beta=-0.43(.05)$; $p<0.01$). Job control and support were negatively associated with GHQ12 (control $\beta=-0.39(.04)$; $p<0.01$; support $\beta =-0.62(.10)$; $p<0.01$) and positively associated with wellbeing (control $\beta=0.55(.06)$; $p<0.01$; support $\beta =1.24(.14)$; $p<0.01$) and efficacy (control $\beta=0.60(.04)$; $p<0.01$; support $\beta=0.43(.10)$; $p<0.01$). Hence, with higher levels of job control and support, individuals reported better levels of general health, wellbeing and efficacy.

The regression model with these three JDCS variables explained an additional 3% of the variation in the GHQ12 values, 6% more of the variation in scores for

mental wellbeing and 2% of the variation in scores for efficacy with age, gender and seniority controlled for.

Additional regression modelling was undertaken to study the potential contribution of each JDCS dimension to the relationship between SC and HC and our outcome variables (table 5.5 and 5.6). Job demands, control and support showed a significant contribution to the association of SC (table 5.5) and HC (table 5.6) with GHQ12 scores and wellbeing levels. Although, job control and support were independently associated with work efficacy in both the SC and HC models, no association was seen for job demands. Interpretation of the changes of the regression coefficients revealed a consistent and substantial attenuation of the coefficients for health climate and each of the three outcomes and to a smaller degree for safety climate and all the outcomes.

Regression models were also tested with inclusion of the interaction variables DxC and DxCxS, these variables did not show a significant association with the outcomes (data available upon request).

4. Discussion

The current study, set out to explore the scarcely examined associations of SC and HC with psychosocial work factors and how these concepts relate to health and efficacy outcomes. This study tested three hypotheses. Hypothesis 1, which presumed that safety climate and health climate were negatively associated with job demands but positively associated with control and support, was accepted. However, the magnitude of the associations was low for job demands and moderate for control and support. The link found with psychosocial work

factors is supported by other scholars (Phipps and Ashcroft, 2011; Phipps *et al.*, 2012) although not all (Gillen *et al.*, 2002; Rydstedt and Lundh, 2012). This is in line with other findings where lower levels of SC reflected a perception of sub-optimal or reduced OHS conditions (Zohar, 1980; Varonen and Mattila, 2000; Zohar, 2000; 2003). Previous empirical work showed an association between HC and support (Ribisl and Reischl, 1993) in line with our findings.

Hypothesis 2 was accepted as safety climate and health climate were positively associated with health, wellbeing and efficacy of HSPs although the magnitude of association was low for health climate. Our findings are consistent with Arcury *et al.* (2012) who found a link between SC and musculoskeletal disorders. The current results are, however, not surprising considering that lower levels of safety climate generally indicate work environments with more occupational accidents or injuries (Isla Diaz and Diaz Cabrera, 1997; Clarke, 2006b; Beus *et al.*, 2010) and with “poorer” OHS conditions (Zohar, 2003) which may not support good health.

Empirical data demonstrating the relationship between HC and level of health and wellbeing is scarce although, similarly to the current study, Ribisl and Reischl (1993) found associations between this concept and health outcomes. To our knowledge, there is no research showing a relationship between SC or HC and efficacy. Our results provide a new insight into HC's role in the workplace. One can assume that in an environment with stronger HC, employees might feel more encouraged to engage in healthy behaviours improving their wellbeing. A healthier workforce is more efficient and

productive (Burton et al., 1999; Bunn et al., 2001; Koopman et al., 2002), which might explain the link found between HC and efficacy.

Hypothesis 3 addressed two issues: first, the associations of job characteristics (demand, control, support) with health, wellbeing and efficacy; second, the role of job demands, control support on the association between HC, SC on one side and health, wellbeing and efficacy on the other side. Consistent with H3, high demands, low control and low support were negatively associated with HSPs health, wellbeing and efficacy although the association with support was generally low. The associations were most substantial for general health with job demands explaining 15% and job control an additional 14% of the variation after adjustment for age, gender and seniority. For efficacy most of the variation (26%) was explained by job control. Demands were not significantly linked to efficacy and the effect for support was very low (2%), contrary to Taris *et al.* (2010). For HSPs in particular, the current results are generally in line with the rational previously presented, however these also provided insight into the relevant dimensions of job characteristics with job control emerging as the most relevant one.

The results also gave insight into possible mediation effects linking SC and HC with health, wellness and efficacy via job characteristics. The regression coefficients linking health climate and safety climate to the outcomes were clearly reduced when entering job demands, job control and support into the models which could be indicative of partial mediation. Nevertheless, this was observed in this specific sample of HSPs whose job characteristics and working

conditions can have a wide variation and is also highly distinct from the general workforce. Further studies in additional work groups and activities sectors are required to clearly understand the links of HC and SC with health and work efficacy outcomes with possible mediation by psychosocial risk factors.

Our results highlight the potential impact of SC and HC on these practitioners' job demands, control and support. In a low SC workplace, HSPs might not be conferred with true decision making ability or power for action and may find themselves with lower control over their work. Furthermore, in a setting with sub-optimal SC, OHS will probably have less support from management and company stakeholders (Flin *et al.*, 2000; Mearns *et al.*, 2003; Zohar, 2003).

In addition, the link of SC and HC with work efficacy was also demonstrated by the current study adding this outcome to the various benefits of a strong SC and HC at work. When interpreting these results, it becomes clear how SC and HC can affect HSPs health, wellbeing and efficacy as professionals and as part of the workforce. Job control and support also seemed to lead to higher levels of work efficacy, demonstrating the importance of these psychosocial work factors to the wellbeing and efficacy of the HSPs workforce.

With the aforementioned in mind, it is plausible to assume that SC and HC have a significant impact on HSPs health and efficacy which may be partly mediated by the level of job demands, control and support inherent to their workplaces. In cases of low SC, it seems reasonable to assume that higher demands will be placed on the HSP who may then be working in an environment with lower job control and support. This can, ultimately, affect their levels of general health

and mental wellbeing and efficacy. Interestingly, the findings indicate that, in a situation of low SC, it is the low levels of job control and support at work that seems to affect the HSPs efficacy and not job demands.

4.1. Study's limitations and strengths

This research provided new data to inform an area with sparse empirical evidence. Research on SC generally focuses on its link with safety outcomes (Clarke, 2006b; Beus *et al.*, 2010) and studies on the associations with mental and physical health or efficacy in the workforce are rare. Additionally, JDCS has been widely studied in relation to health outcomes but not with efficacy as in the current study. An additional strength of this study is the fact that it conceptualises HC and SC as potential antecedents to these job characteristics. This is a research area with great further potential.

Although the response rate was low, we are confident that the present study was fairly representative of employed HSPs in the UK and Ireland as underlined by our non-responder analyses. The sample comprised of 95.7% practitioners from the UK and 79% males. The sample obtained was similar to this population with 91.5% UK respondents and 76.5% male individuals. Additionally, participant's activity sectors was proportionally similar to the figures reported for IOSH's members (IOSH, 2012) and comparable to the UK statistics on registered business per sector for 2013 (Office for National Statistics, 2013; Department of Finance and Personnel, 2014). This comparison was not possible for the Irish sample due to the different classification system used for this country's national statistics on activity sectors.

The HSPs working characteristics and exposure to psychosocial risks might be different according to their sector of activity. For instance, individuals working in industry might be exposed to different stressors or psychosocial risk factors from those working in healthcare or hospitality. Hence, further studies determining the specific relevant psychosocial factors for each activity sector and analysing their association with SC, HC and health or work efficacy would be relevant.

Considering the sample of HSPs in this study, it was not possible to measure SC at group level, as shared perceptions of individuals in line with the original operationalisation of this concept by Zohar (1980; 2000; Zohar and Luria (2005)). Research has shown that a group-level measurement of SC may lead to stronger associations with safety performance and health outcomes than at individual-level assessment which reflects the individual person's perspective and is influenced by unique nuances of the person (Christian *et al.*, 2009; Beus *et al.*, 2010). However, measuring SC at the individual-level was the only feasible method to follow in the present study, considering the dispersion of HSPs per organisations and geographical area. Therefore, a modest bias can be expected in the current findings. Future research, with a sample from the wider workforce, from various sectors and with a group-level measurement of SC, will allow to determine with further detail the associations between this concept and HC, health, safety performance and work efficacy.

For this study, self-reported outcomes were used due to the large geographical distribution of the sample. Hence, data might be exposed to social-desirability

or response bias with those more engaged in their role more likely to complete the questionnaire. The associations may also have been affected by common methods bias as self-reported measures were used for both, the exposure and the outcome. The potential bias associated to web-surveys cannot be excluded either. Furthermore, the survey availability (email address) could not be controlled for, hence there is the possible interference of “healthy worker effect” if the work email address was used, HSPs on prolonged sick leave might not have received the web-survey invitation. This study, due to its cross-sectional design could not establish causality.

4.2. Conclusions

Health and Safety Climate showed a significant link with health and wellbeing demonstrating the benefits of strong SC and HC in organisations. Perhaps further attention should be dedicated to the impact of these two concepts on the general health and wellbeing of the wider workforce and its possible relationship with sickness absence, lost work days, work-related illness among others. Studies exploring these associations would be useful in a follow-up design and using self-reported as well as officially reported statistics and medical records. This may inform health and safety practice by providing sound research evidence of the benefits of a strong SC to both employers and employees.

This study provided a first look into the potential contribution of JDCS to HC and SC’s association with health, wellbeing and efficacy. The findings showed the potential for a mediation effect in this association which requires a further

and deeper analysis for full understanding of these relationships although this was beyond the scope of this paper. Similar associations can be explored with additional psychosocial and wellbeing outcomes such as job satisfaction, work engagement, commitment among many others. Although the current associations were studied within the context of HSPs work, similar research would be beneficial in the general workforce.

Further research may focus with greater detail on the possible impact that job demands, control and support may have on HSPs. Our findings could suggest that, by providing supportive work environments with greater scope to make decisions regarding their job and an improved management of their demands, HSPs could work with greater efficacy and wellbeing. This can, ultimately, contribute to the improvement of the overall OHS conditions in the organisation and its OHS performance.

These results highlight the relevance that SC and HC hold for the HSPs' work performance. As the professional responsible for shaping OHS in organisations, a positive SC and HC may, possibly, be reflected in improved OHS performance in the organisation.

Although HSPs are generally not seen as professionals facing their own OHS risks and hazards at work, this study demonstrated how organisational and psychosocial work-related factors, can affect these individuals. It is essential to consider the work-related factors for this particular professional group since this has been an area somewhat overlooked and which can have a pervasive impact on the OHS of the wider workforce. After all, these are the practitioners

who vouch for the best working conditions for employees and company's stakeholders. If they look after workers, who looks after them?

Table 5.1 – Sample Characteristics

	Frequency	
	N (879)	%
Gender		
Male	672	76.5
Female	207	23.5
Country of work		
United Kingdom	804	91.5
Ireland	64	7.3
Not specified	10	1.1
Sector of Activity		
Admin. & services and Professional Tech.	188	21.4
Scientific		
Industry	270	30.6
Construction	134	15.2
Public Administration and Defence	125	14.2
Health and social work	43	4.9
Entertainment/recreation transportation and retail	100	11.3
Other	19	2.2
Job title		
Manager, Director, Head, Lead, Coordinator	448	51.0
HS Advisor	169	19.2
HS Officer	135	15.4
HS Practitioner or specialist	89	10.1
Other	18	2.0
Not specified	20	2.3
Seniority (years working as HSP)		
0-3 years	57	6.5
4-10 years	332	37.8
11-20 years	374	42.5
21 or more years	116	13.2
Age		
0-30 years	29	3.3
31-45 years	278	31.6
46-55 years	357	40.6
56 or more years	215	24.5

Table 5.2 – Descriptive statistics for summary scales on psychosocial characteristics of work

	N	Min.	Max.	Mean	Std. Dev.	Threshold value
Organisation-level Safety Climate	843	16	80	57.24	12.40	48
Health Climate	867	5	25	15.63	3.47	15
Efficacy	873	6	42	34.09	6.13	24
Job control	867	8	32	25.76	4.74	30
Job demands	870	18	48	32.96	5.76	30
Co-worker support	871	4	16	11.85	1.99	10
General Health (GHQ12)	859	0	36	11.75	6.24	15
Mental Wellbeing (WEMWBS)	845	14	70	48.81	8.83	42

Table 5.3 - Hierarchical Multiple Linear Regression models testing the association of Health and Safety Climate (Independent variables) with Job Demands, Control and Support (dependent variables) – *Hypothesis 1*, and GHQ12, WEMWBS, Efficacy – *Hypothesis 2*.

	Job Demands				Job Control				Job Support				GHQ12				WEMWBS				Efficacy			
	R ² Change	β (SE)	95% (CI)	p	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p
Safety Climate (range 16-80)	.01	-.05 (.02)	(-.09,-.01)	.01	.14	.15(.01)	(.12,.17)	<.01	.18	.07(.01)	(.06-.08)	<.01	.11	-.17 (.02)	(-.21,-.14)	<.01	.12	.25(.02)	(.19,.30)	<.01	.12	.18(.02)	(.14,.21)	<.01
Health Climate (range 5-25)	.01	-.17 (.06)	(-.28,-.06)	.01	.07	.37(.05)	(.26,.47)	<.01	.13	.21(.02)	(.17-.25)	<.01	.05	-.40 (.06)	(-.53,-.27)	<.01	.08	.73(.08)	(.55,.91)	<.01	.08	.50(.06)	(.39,.63)	<.01

Note: All analyses adjusted for age, gender and seniority in the first step.

Table 5.4 - Hierarchical Multiple Linear Regression values for the association of Job Demands, Job Control and Support (Independent variables) with Mental Health, Wellbeing and Efficacy (dependent variables) – *Hypothesis 3*.

	GHQ12				WEMWBS				Efficacy			
	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p
Job Demands (range 18-48)	.15	.43(.04)	(.36,.51)	<.01	.08	-.43(.05)	(-.52,-.34)	<.01	.003	-.06(.04)	(-.13,.02)	.10
Job Demands Job Control (range 8-32)	.14	.39(.03) -.51(.04)	(.32,.46) (-.59,-.43)	<.01 <.01	.17	-.36(.05) .78(.05)	(-.46,-.27) (.65,.91)	<.01 <.01	.26	-.01(.03) .68(.04)	(-.06,.06) (.59,.75)	.87 <.01
Job Demands Job Control Job Support (range 4-16)	.03	.37(.03) -.39(.04) -.62(.10)	(.30,.44) (-.48,-.29) (-.85,-.40)	<.01 <.01 <.01	.06	-.33(.04) .55(.06) 1.24(.14)	(-.42,-.23) (.43,.68) (.95,1.55)	<.01 <.01 <.01	.02	.01(.03) .60(.04) .43(.10)	(-.05,.07) (.50,.69) (.18,.69)	.82 <.01 <.01

Note: All analyses adjusted for age, gender and seniority in the first step

Table 5.5 - Hierarchical Multiple Linear Regression values for association of Safety Climate (Independent variable) with Mental Health, Wellbeing and Efficacy of the HSPs (dependent variables) with incremental inclusion of job demands-control-support.

	GHQ12				WEMWBS				Efficacy			
	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p
Model 1: Safety climate (range 16-80)	.01	-.05 (.02)	-.21,-.14	<.01	.12	.25(.02)	.10,.30	<.01	.12	.18 (.02)	.14,.21	<.01
Model 2 Safety Climate Job Demands (range 18-48)	.12	-.15(.02) .39(.03)	(-.19,-.12) (.31,.47)	<.01 <.01	.06	.23(.02) -.37(.05)	(.018,.28) (-.47,-.28)	<.01 <.01	.00	.17(.02) -.02(.03)	(.14,.21) (-.09,.05)	<.01 .58
Model 3 Safety Climate Job Demands Job Control (range 8-32)	.09	-.09(.02) .37(.03) -.42(.04)	(-.13,-.06) (.30,.45) (-.52,-.33)	<.01 <.01 <.01	.11	.13(.02) -.34(.04) .66(.06)	(.08,.18) (-.44,-.25) (.52,.79)	<.01 <.01 <.01	.17	.09(.02) .01(.03) .59(.04)	(.06,.12) (-.05,.07) (.51,.67)	<.01 .75 <.01
Model 4 Safety Climate Job Demands Job Control Job Support (range 4-16)	.02	-.07(.02) .36(.03) -.35(.04) -.49(.10)	(-.10,.03) (.28,.44) (-.45,-.20) (-.73,-.25)	<.01 <.01 <.01 <.01	.04	.08(.02) -.32(.04) .51(.06) 1.09(.14)	(.03,.13) (-.41,-.23) (.39,.63) (.77,1.39)	<.01 <.01 <.01 <.01	.01	.08(.02) .02(.03) .55(.04) .28(.10)	(.04,.11) (-.04,.07) (.47,.64) (.04,.52)	<.01 .62 <.01 .03

Note: All analyses adjusted for age, gender and seniority in the first step

Table 5.6 - Hierarchical Multiple Linear Regression values for association of Health Climate (Independent variable) with Mental Health, Wellbeing and Efficacy of the HSPs (dependent variables) with incremental inclusion of job demands-control-support.

	GHQ12				WEMWBS				Efficacy			
	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p	R ² Change	β (SE)	95% CI	p
Model 1 Health climate (range 5-25)	.05	-.40(.06)	(-.53,-.27)	<.01	.08	.73(.08)	(.55,.91)	<.01	.08	.50(.06)	.14,.21)	<.01
Model 2 Health Climate Job Demands (range 18-48)	.13	-.33(.06) .41(.03)	(-.46,-.20) (.33,.49)	<.01 <.01	.06	.66(.08) -.39(.05)	(.049,.82) (-.48,-.29)	<.01 <.01	.001	.50(.06) -.03(.04)	(.39,.62) (-.10,.04)	<.01 .44
Model 3 Health Climate Job Demands Job Control (range 8-32)	.12	-.16(.05) .38(.03) -.48(.04)	(-.28,-.04) (.31,.45) (-.57,-.39)	.02 <.01 <.01	.13	.41(.08) -.35(.05) .70(.06)	(.25,.58) (-.43,-.25) (.59,.82)	<.01 <.01 <.01	.21	.28(.05) .01(.03) .62(.04)	(.16,.39) (-.05,.06) (.54,.70)	<.01 .81 <.01
Model 4 Health Climate Job Demands Job Control Job Support (range 4-16)	.03	-.07(.06) .37(.03) -.38(.04) -.58(.10)	(-.20,.05) (.30,.44) (-.48,-.29) (-.83,-.34)	.28 <.01 <.01 <.01	.05	.24(.08) -.32(.04) .53(.06) 1.11(.14)	(.08,.41) (-.41,-.23) (.39,.67) (.81,1.44)	.01 <.01 <.01 <.01	.01	.23(.05) .01(.03) .57(.04) .31(.10)	(.13,.32) (-.04,.07) (.48,.66) (.07,.58)	<.01 .63 <.01 .01

Note: All analyses adjusted for age, gender and seniority in the first step

Chapter 6 – Thesis Discussion and Conclusion

6. Thesis Discussion and Conclusion

6.1 Summary of findings

This piece of work has endeavoured to explore the role of SC and the HSPs in the current work environment faced with newly emerging and modern challenges. Figure 6.1 provides an overview of the main findings for the studies included the current doctoral research.

Paper 1 and paper 2 of this thesis suggest that the current scientific evidence for a causal relationship of SC with accidents and/or injuries at work is unclear. On the one hand, as shown in the systematic review (Paper 1), studies still lack the methodological requirements to show the causal link between this concept and the mentioned safety outcomes. On the other hand, SC's association with accidents and injuries seems to be complex and warrants further research for a clear understanding of its applicability to all workers in current workplaces. The heterogeneity, especially in what concerns the contractual agreements, and the effect on SC needs to be studied further as shown in paper 2.

The third paper in this thesis (Paper 3) demonstrated that HSPs are, to a very small degree, included in psychosocial risk management and assessment, to a moderate degree in health promotion activities and to a large degree in the management of safety culture in organisations. These results highlighted that psychosocial risk prevention and management is not well integrated in OHS systems. This creates a challenge in ensuring a holistic and multidisciplinary approach for prevention of these hazards for and integrated OHS management.

SC also showed to be a significant concept for the HSPs at professional level (affecting their work conditions and efficacy) and at personal level (impacting on their health and mental wellbeing). Findings from paper 4, showed that work-related organisational and psychosocial factors (i.e. job demands-control-support) affect the HSPs with potential impact on workers and stakeholders within the organisation.

In the next section the findings from this thesis are discussed in the overall context of this piece of work, with a reflection on the significance to the field and the contribution to the knowledge in this area of research.

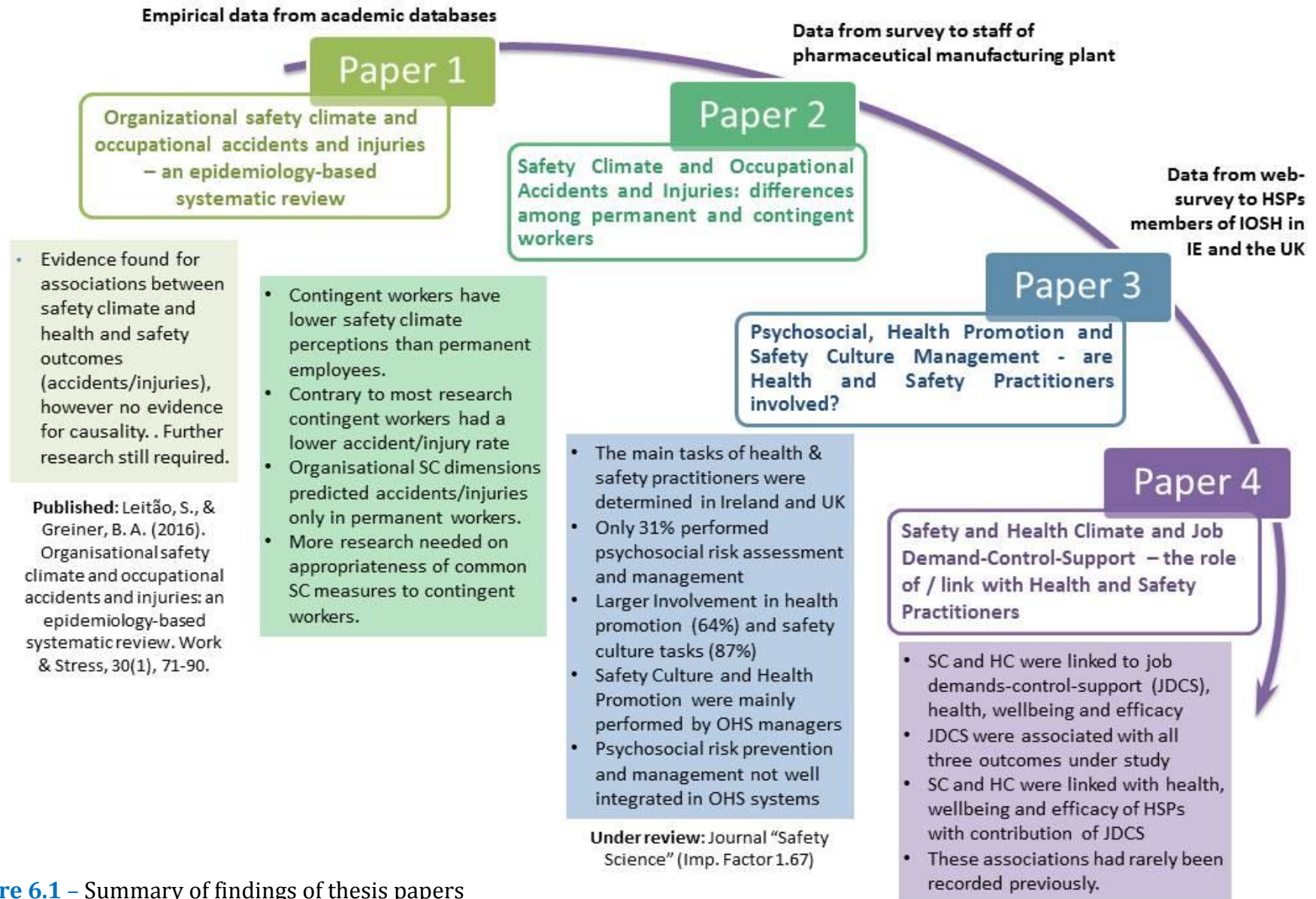


Figure 6.1 – Summary of findings of thesis papers

6.1 Thesis Discussion

This research set out to study Safety Climate (SC), seeking further understanding on the links this concept holds with characteristics of work and of organisations. The current thesis also aimed to determine, with further detail, the relationship that SC has with OHS performance and the health and wellbeing of the workforce. Additionally, this study sought a clearer understanding of the role of Health and Safety Practitioners (HSPs) within the Occupational Health and Safety (OHS) context and the current working environment intending to gain a greater insight on the factors that affect these practitioners at work.

Safety Climate

As SC was a central concept for this thesis, I started by establishing a clear definition of this construct and clarifying some of the ambiguities surrounding this area of knowledge. As part of the systematic review it was possible to create a clear distinction of safety climate from safety culture and define the former as a construct with a focus on organisational dimensions distinct from individual behaviour. The relevance of the organisational dimensions of SC was also shown in paper 1 and 2, as several of these dimensions showed an association with accidents and/or injuries. This demonstrates the importance of a SC centred on organisational aspects of work rather than person-related factors. The conceptualisation of SC established in this systematic review instructed this thesis guiding the study of SC's impact on organisations, its

workforce and on HSPs in particular, while also exploring this concept's relevance for OHS and public health. In paper 2 and 4, these links were explored further as the relationship of SC with health, wellbeing, work efficacy and safety indices (accident and injury rate), was clearly demonstrated. The findings of these studies have supported the premise of this thesis which places SC in the core of the Healthy Workplaces Framework as a pivotal element with potential impact on the work environment and the health and wellbeing of individuals. However further research is needed to provide evidence on the direction of potential causation as SC may impact on working conditions, although working conditions might also impact on SC. These may also have a cyclical effect with each other.

Paper 2, in particular, raised further pertinent questions regarding the application of the SC concept in research. This study, with a sample of permanent and temporary workers, showed that SC might be understood and interpreted differently by non-permanent (contingent) workers. As discussed throughout this thesis, the work environment and its workforce are changing. New demands and challenges have emerged and both managers and OHS now face different characteristics and conditions within the labour force, including diverse forms of contract agreements. In its original conceptualisation, SC was designed as a construct to apply, essentially, to a permanent workforce. Thus, it seems relevant to reflect on the implications the growing number of contingent workers and the heterogeneity in the labour market may have for this concept and its application. Adjustments may be required for SC as concept and for its measurement, creating or modifying specific items and translation into practice

(providing adequate recommendations and implementation of adequate measures and practices). Furthermore, it will be important to consider the potential bias associated to the different contractual agreements present in the workplace. As discussed in paper 2, bias might arise due to systematic under-reporting of outcomes by contingent workers. The use of official data or recorded information may mitigate against this bias to some degree, however officially recorded accidents are usually also subject to systematic bias and generally do not include minor accidents and injuries.

The new heterogeneity in the workforce, particularly the growing number of non-permanent work contracts, is known to result in health and safety-related issues which become part of the many aspects to be managed by HSPs as the professionals driving and operationalising OHS in organisations. Additionally, these OHS issues might contribute to an increase in the HSPs' job demands and perhaps reduce their job control which, as shown in paper 4, are linked to these practitioners' health and work efficacy. This is, therefore, a challenge with the potential to affect the workforce, the general OHS performance of a company but also HSPs directly.

Furthermore, in the context of this thesis SC was conceptualised as a construct with the potential to affect the working conditions and safety environment of an organisation. Similar to other scholars I addressed SC as an antecedent of safety outcomes (Christian *et al.*, 2009). In addition, the current thesis adds a novel view as it conceptualises SC as an antecedent of healthy and safe working conditions with a focus on factors related to the organisation and the way work is managed. SC is considered to affect the work environment both physical (e.g.

due to increased management involvement and buy-in in managing adverse physical work exposures as per Christian *et al.* (2009)) and psychosocial (as per Dollard and Bakker (2010)). In this way the concept of safety climate has the potential to bring together two traditionally separated streams of thought: the safety tradition and the psychosocial work tradition. It is, therefore, understood that SC is a concept with impact at higher levels in the organisation, affecting working conditions and, consequently, having an effect on the overall safety performance and workers' health and wellbeing. These links were specifically tested for the working conditions of HSPs in this thesis. Hence, further application of the hypothesis of SC as antecedent to OHS working conditions is recommended.

The theoretical links suggested in the conceptual framework applied in this doctoral research (based on an expanded Healthy Workplaces Framework) – fig. 6.2 - have been supported, overall, by the empirical findings. The relationship of SC with the HSP, the physical and psychosocial work environment and the health and wellbeing in the organisation was evidenced. Hence, the central role of SC in the work environment has been demonstrated, revealing how the organisational characteristics of the workplace and the involvement and support from managers, workers and stakeholders are essential for the achievement of a positive SC. The impact of SC on the physical and psychosocial work environment as well as the health and wellbeing of individuals at work has also been shown, as previously explained. In paper 2, psychosocial factors of work (such as contract type), organisational characteristics and management measures showed to be relevant for SC in the

workplace. This concept also revealed a significant link to the psychosocial work environment in paper 4, demonstrating an association with job demands, control and support.

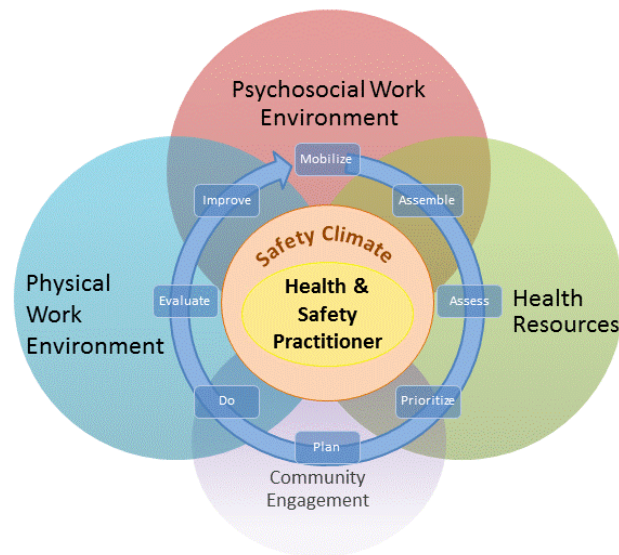


Figure 6.2 – Healthy Workplace Framework applied to this doctoral research.

Additionally, SC has demonstrated an association with safety outcomes such as accidents and injuries (as per paper 1 and 2 of this thesis). The relationship between this concept and health and wellbeing has, therefore, also been evidenced in this research. Firstly, through the aforementioned association between SC and accidents/injuries which will have a direct impact on the health of individuals. Secondly, as shown in paper 4, general health and mental wellbeing can be associated to SC in the organisation.

Lastly, SC's relationship with the HSPs was confirmed as these practitioners' wellbeing and work efficacy were linked to the levels of SC in their workplace.

“Health” and “Safety” in the workplace

As discussed in the systematic review (paper 1) and paper 2, SC research mainly approaches this concept from a safety point of view, with studies focusing on the associations of SC on physical health, safety performance and productivity (e.g. injuries, lost time, efficiency, production efficacy) - (Mearns *et al.*, 2003; Clarke, 2006b; Fullarton and Stokes, 2007; Beus *et al.*, 2010; Bahari, 2011; Arcury *et al.*, 2012). The concept of SC has been complemented with a psychosocial view by a number of scholars with exploration of the policies, practices and procedures in a company which can affect workers' psychosocial safety. This is referred to as Psychosocial Safety Climate (PSC) (Dollard and Bakker, 2010; Law *et al.*, 2011; Dollard *et al.*, 2012; Idris *et al.*, 2012). Both the concept of SC and PSC are seen as components of organisational climate and both have been associated with OHS outcomes in research (Clarke, 2006b; a; Dollard and Bakker, 2010). However, there is a scarcity of research combining the physical safety perspective with the psychosocial perspective as most research is focussed either on one or the other approach. This thesis was aimed at filling this gap and took a unified approach to OHS as it was shown that SC is associated with both physical and psychosocial health (Christian *et al.*, 2009; Beus *et al.*, 2010; Phipps *et al.*, 2012). Additionally, the study presented in paper 4 showed that health climate in addition to safety climate is associated with general and psychosocial health of HSPs. Further research in this area is warranted with populations from different sectors and occupational groups.

The disconnection between “Health” and “Safety” within OHS was further demonstrated in the findings from Paper 3 which showed the lack of

involvement of HSPs in activities linked to health promotion and psychosocial risk management. This would indicate that the holistic (unified) approach to OHS as recommended by the WHO and ILO, is far from being achieved in Ireland and the UK (figure 1.3, pg 53). Although greater emphasis and attention is now given to the risk assessment and management of the psychosocial work environment, the professionals responsible for the OHS in an organisation do not seem to be, at present, actively involved in this area. Numerous research has shown that psychosocial work-related factors are among the main cause of health concerns and OHS issues (vanStolk *et al.*, 2012; Costa and Santos, 2013; Hinkka *et al.*, 2013; Malard *et al.*, 2013; Eurofound and EU-OSHA, 2014; European Agency for Safety and Health at Work (EU-OSHA), 2015; Jabbour *et al.*, 2015; Money *et al.*, 2015; Niedhammer *et al.*, 2015). In the European Survey on New and Emerging Risks (ESENER), managers and worker representatives were asked about the current OHS conditions and challenges in their workplace. In ESENER2 (2015) the most frequently identified work risk factors were those related to dealing with difficult customers, pupils or patients (58% of establishments in the EU-28), followed by tiring or painful positions (56%) and repetitive hand or arm movements (52%).

Hence, psychosocial work-related factors and mental health aspects seem to be one of the main sources of concern in European enterprises. Nevertheless, only approximately 33% of establishments from EU28 with more than 20 workers reported having an action plan to prevent work-related stress.

While greater involvement was noticed in health promotion activities, a higher engagement of the HSPs in these activities could also bring greater benefits to

OHS in organisations. Nevertheless, in paper 3 it was possible to observe that organisations in the public sector seem to be those where the HSPs were more involved in the aforementioned activities, with the exception of “health and social work”, the activity sector where these practitioners were the least involved in psychosocial or health promotion-related tasks. A similar scenario was noticed within the “construction” sector which showed greater potential (and need) for improvement regarding the involvement of HSPs in activities regarding the management of psychosocial work-related factors.

One possible explanation of the findings could be that a compartmentalised system is applied in many organisations where a specific department (perhaps Human Resources) is responsible for the management of psychosocial issues, another is in charge of providing health services to employees (workplace medicine or nursing) and HSPs take the responsibilities regarding safety at work. The collaboration and integration of these three areas is not evident from the current study’s findings and perhaps might still be one of the main challenges to be faced by OHS and its practitioners in the coming years. With this in mind, it is also plausible to presume that the Healthy Workplaces Framework is not yet being applied or implemented adequately. HSPs do not seem to be at the core of this structure (as suggested by this thesis framework – fig. 6.2) and, therefore, are not fully involved in the different areas relevant for OHS, contrary to the guidance provided by the WHO and ILO and EU-OSHA.

Health and Safety Practitioner’s Role

In the practice of OHS, the engagement of HSPs in activities related to management of psychosocial work factors, health promotion and safety culture

seems to be mainly done by those in a management position. Health and safety managers (or similar) appear to interact at a more global level, overseeing some of the health promotion activities and the tasks related to psychosocial and physical environment, as described in paper 3. This approach from managers, with little involvement of HSPs at different levels (advisors, officers, specialists, and others), can be indicative of an engagement at policy level and with a focus on compliance as this seems to be the priority of organisations in relation to OHS (as seen by the tasks shown in paper 3, and shown by ESENER2 (vanStolk *et al.*, 2012; European Agency for Safety and Health at Work (EU-OSHA), 2015). In the later survey, 85% of management representatives reported that the main motivation for addressing OHS in their organisations was the fulfilment of legal obligations. Finally, pressure from the labour inspectorate (78%) was also cited as the main reason for addressing OHS in the organization, followed by requirements from clients or concerns related to the organisation's reputation (74%). However, it was encouraging to notice that 79% of organisations also stated that "requests from employees or their representatives" was also one of the main drivers for their OHS (European Agency for Safety and Health at Work (EU-OSHA), 2015).

This reiterates the inference regarding managers' higher focus on policy and compliance, a situation also noticed in Ireland and the UK. This study's findings indicate that, in these countries, the recommended "healthy workplaces framework" (Burton, 2010) advocating for an approach with focus on prevention and the promotion of health and wellbeing, is still far from being implemented at a wider level.

Scholars and practitioners have recognised the importance of establishing a “core” structure of competencies for HSPs, providing them with the required awareness, skills and knowledge to deal with the newly emerging issues in the workplace in addition to the more traditional safety functions. This may require further training in specific areas such as psychosocial risk factors and mental health. In fact, competences in the area of “common mental health problems” have been identified as one of the key priorities for the qualification of these practitioners, followed by “management standards for work stress” (Leka *et al.*, 2008; Iavicoli *et al.*, 2011).

As the areas of management of psychosocial risk factors and health promotion seem to be those in which these practitioners are involved the least, perhaps an increase in the training for HSPs in these fields would also be important. With greater awareness of the relevance and link of these areas to OHS and with better knowledge on the application in practice of these concepts, it might be possible to improve the incorporation risk assessment and management and health promotion into the overall management of OHS. Hence, greater focus should be given to the contribution that HSPs can have to the development of health promoting and illness prevention interventions in the workplace.

In order to ensure and promote greater incorporation of psychosocial risk management in the overall OHS practice, it would also be beneficial to promote further clarity in the translation into practice of existing guidance, agreements and regulations to ensure greater efficacy and efficiency in their application to practice.

As mentioned in a previous section, HSPs are often placed on the side-line and are faced with the challenging task of developing and implementing a more integrated and unifying OHS in organisations. This will require additional qualifications for the HSPs which are different from the “traditional technical knowledge on health and safety, human factors and ergonomics, and the rational approach to organizational change, which is often implicit in everyday understandings of change” (Hasle and Jensen, 2006, pg 282). According to Hasle and Jensen (2006) these new qualifications involve concepts, theories, and methodologies concerning organisational theory, change management, and learning organisations which can be challenging for HSPs to develop without the adequate competency framework and resources. Tailored education and training can also allow HSPs to be better equipped for their role in encouraging and/or leading the change within their organisation promoting a holistic and prevention focused approach in OHS (Blair, 1999; Blair, 2003; DeRose, 2004; Gual Llorens *et al.*, 2014; INSHPO - International Network of Safety & Health Practitioner Organisations, 2015).

The study by Leka *et al.* (2008) on HSPs training and competence needs, also highlighted similar areas which both experts and practitioners considered important for the current and future practice of OHS. These competences and knowledge encompassed areas beyond the specific OHS expertise and include elements such as conflict management, persuasion and behaviour change, influencing and leadership skills, management, organisational and communication skills, risk perception and understanding organisational change. Other important issues were change management, development of legislation

and guidance, and organisational culture and professional codes of conduct (including ethics, confidentiality, record keeping, and awareness of boundaries and competence).

Husman and Husman (2006) also pointed out the importance of ensuring high-quality training for all HSPs in order to guarantee the adequate functioning of OHS services. Furthermore, these authors argue that a reduction in the “regional variation” of the role and qualifications required is essential to ensure adequate OHS services across the board. This had also been an issue previously raised by Hale (1995b) who observed that many countries have already regulated the training of HSPs, however this was not a standardised system across Europe or other areas of the globe.

Such education for HSPs should encompass professionals brought to the OHS career from different paths, be that the path of academia and higher education - by including these subjects in the university level courses - or the pathway of professional training and experience - by increasing the presence of these themes in professional and certification courses in the area of OHS. Furthermore, specific continuing professional development units (CPDs) focussed on the management and prevention of psychosocial risk factors and health promotion should be developed and its attendance encouraged among these professionals. This would allow the preparation of professionals already in practice who have not had training in these areas and provide a chance for refreshing and updating knowledge in this field for those who have previously received education in it.

A particular novel angle that came from this dissertation is that this continuous professional and personal development can also raise these practitioners' awareness for the risks and hazards for their own health and work efficacy present in their workplace, providing them with the ability to prevent and manage these issues.

As stated by Husman and Husman (2006), it is also essential that HSPs are trained adequately, to be able to set up versatile and multidisciplinary teams, collaborating with experts and being ready to deal with the rapidly changing demands of this professional area. Leka *et al.* (2008) added that the role of HSPs is viewed by experts as a proactive and preventive role that requires working with other disciplines and professional groups. Hence, the activity of this practitioner should involve various interactions with diverse professionals and stakeholders in the organisation. For instance, ideally HSPs should engage with human resources specialists to assist and be up-to-date with issues that might be affecting the personnel but also to contribute in the selection and allocation of new staff; collaborate with engineering, planning, infrastructure and logistics and supplies teams in order to have a say in new plants, resources (materials, biological or chemical supplies) or equipment that might be implemented in the organisation as well as be informed of any updates that might be required and planned to put in place; occupational health and medicine staff to be aware of the main issues that are affecting individuals and the priorities to address in preventative and health promotion actions; among many other teams and professionals of relevance such as environment and security.

Although the HSPs are one of the essential elements to shape and influence the OHS in the organisation, changes in practice and management of OHS cannot be achieved solely by practitioners individually. A strong culture of both safety and health is essential for the successful implementation of a unified approach in OHS. Furthermore, strong backing from management is also fundamental to allow the reshaping of the role and responsibilities of HSPs, encouraging proactivity, initiative and a vision of priorities that go beyond safety compliance, with greater focus on prevention, psychosocial and organisational risk management and health promotion.

This change can and should also take place at community and governance level. Beyond the individual and the organisational level, societal conditions play a large role in shaping OHS. From a public health perspective, legislation, policy and models of good practice should be among the priorities of governments when addressing work-related health and safety issues. Hence, national and international governance and its regulations also play an essential part in the prevention and protection against the negative consequences of work on individuals and communities. This, in turn, will contribute to a reduction in the incidence of disorders exacerbated by working conditions, leading to a decrease in the burden of health problems on the community, nationally and internationally and on its resources, completing the cycle which unites OHS and Public Health (Hammig, 2014; Siegrist, 2014).

Public health is a multidisciplinary discipline which aims to prevent disease and premature death and, therefore, prolong life, reduce social inequality in health, and improve as well as promote health in populations. Occupational health

holds similar interests and, although its action is focused on the workplace, its impact goes beyond the borders of the organisation or work environment. Hence, OHS is an area of health which is closely tied to population health and of relevance to every individual in the population, even those not in active employment.

6.2 Strengths and limitations

This research looked at the scarcely studied relationship of SC and HC with psychosocial work-related factors, health outcomes and work efficacy. These were associations which had not been specifically addressed previously but which have, in this research, shown to be relevant to OHS and the wellbeing of individuals.

Additionally, this piece of work contributes to the discussion on SC regarding its current application and its links with work and wellbeing outcomes, while raising new views and questions regarding the future direction of the concept.

The systematic review performed at the commencement of this thesis informed the research developed ensuring a sound conceptual basis for the succeeding studies performed, particularly, the work depicted in papers 2 and 4.

Two different datasets were used for the studies in this thesis that captured the perspectives of two groups of OSH stakeholders. The data for paper 2 was collected from workers and managers in a pharmaceutical manufacturing company, providing their views and SC perceptions from a workforce perspective. Information for papers 3 and 4 was collected from HSPs, members of IOSH in the UK and Ireland, from a professional point of view, investigating

their role in the organisations, their perceptions of SC, wellbeing, work efficacy and of their psychosocial work-related factors.

Finally, the current research provided a view which brings the different OHS areas together unifying physical health, psychosocial wellbeing and health promotion, reflecting on the recommended holistic approach to this field, its current application and potential impacts.

However, as with all empirical research this study also faced some challenges and methodological limitations which should be considered. The studies in this research had a cross-sectional design which did not allow to infer causation. Considering the time period in which data was collected, individuals with severe health issues or with chronic conditions causing them to be on disability, extended sick leave or early retirement might not have taken part in the surveys (either because the survey invitation was sent to their work email or due their own possible inability to complete it). Hence, there is a possibility that the “healthy work effect” has affected these findings by reducing the strength of the associations explored, although this bias generally has a greater impact on cohort research (Li and Sung, 1999; Baillargeon, 2001; Shah, 2009).

Furthermore, as the data for the research studies was collected through questionnaires, both the exposure and outcome variables relied on self-reported measures. As explained in papers 2, 3 and 4, it was not possible to use official company records on health or safety outcomes. In paper 2 company data on officially reported accidents and injuries was not used as it only encompassed incidents of higher severity and thus presented a very small proportion of the accidents or injuries occurred. Additionally, for paper 3 and 4,

it was not possible to obtain company records for each of the HSPs participating and there were no official health and safety records (e.g. absenteeism, sickness absence, reported accidents or injuries) for HSPs specifically, to use as a reference. Consequently, there is potential for response bias and common-method variance. Although the studies used pre-validated and piloted surveys applying some of the methods recommended for controlling for response bias (Podsakoff *et al.*, 2003), it was not possible to exclude the potential effect of common-method variance. Therefore, as both the exposure and outcome variables were measured through self-reported data, an inflation of the associations of SC and HC with accidents/injuries, health and wellbeing, efficacy and/or JDCS may be expected (Lindell and Whitney, 2001; Meade *et al.*, 2007).

Lastly, considering the sample of HSPs in these research studies, it was not possible to measure SC at group level, as shared perceptions of individuals in line with the original operationalisation of this concept by Zohar (1980; 2000; Zohar and Luria (2005)). Empirical data has shown that safety climate measured at group level generally shows stronger relationships with safety performance and health outcomes than at individual level which represents the individual person's perspective and is influenced by unique nuances of the person (Christian *et al.*, 2009; Beus *et al.*, 2010). Therefore, a modest bias can be expected in the analyses for paper 2 and paper 4.

6.3 Recommendations and further research

The current research may inform future research in this field. Firstly, the lack of cohort and controlled intervention studies to investigate SC and its association

with OHS outcomes is evident. Furthermore, the differential associations of SC and OHS outcomes for permanent and temporary workers warrant more detailed research. It would be pertinent to study SC's impact on the health and safety outcomes of workers with different contract types over time while observing the possible impact of the increase or decrease in the amount of contingent contracts in the workforce. Additionally, it would be relevant to study the HSPs working conditions in the post-recession period, investigating whether they improve or decline and analysing the possible effects on the HSPs health and work efficacy.

Furthermore, qualitative data on HSP's view of their role would also provide a deeper understanding of this professional area. This type of research would provide further information on the meaning of the associations of SC with psychosocial work-related factors and health, wellbeing and work efficacy noticed in this thesis. This can offer further clarity on the impacts of psychosocial work-related factors on these practitioners' job. Qualitative data could, therefore, provide an important insight into the variety of roles and scope of the responsibilities in this profession, allowing to understand if the views from these professionals coincide with scientific concepts and hypotheses studied by the scientific community.

As previously discussed, the disconnection between the area of "Health" and the area of "Safety" is still evident. Hence, it would be beneficial to perform further research for validation of health and safety climate measurement tools (with both concepts integrated) and their application for applied surveys that directly inform OHS practice. Additionally, studies could explore the option of bringing

together the psychosocial and physical dimensions of health climates and safety climates. This could be achieved by investigating a method to measure health and safety climates encompassing the physical health components of SC and the psychosocial health dimensions of the concept of psychosocial safety climates.

Furthermore, research scientifically investigating and evaluating the implementation of the WHO “healthy work organisation” framework still seems somewhat scarce and scattered. Thus, it would be prudent to carry out a systematic review focussed on the implementation of this OHS framework to provide scholars and practitioners with examples of success on the application of this holistic approach, with models of best practice and clear evidence on the associated benefits.

The issue of employment contract’s impact on SC has also been noticed as a highly relevant area for OHS and the application of the SC in coming years (Sinclair *et al.*, 2010; Houdmont *et al.*, 2012). Hence, a meta-analysis could allow for further exploration in this area

This research has also produced a wealth of data which will be useful for further investigations in this field. Due to time constraints and limitations in the available resources, only a selection of the data collected for this research was used for this thesis. However, there is still great potential to explore links of SC and health outcomes (such as general health, fatigue, mental wellbeing) with role clarity, role ambiguity, authority, role conflicts within HSPs. Also, by studying these job characteristics per industry and per company characteristics (e.g. company size, country of activity, HSP job title, among others), one might be able to achieve a clearer understanding of the diverse job profiles of HSPs in

Ireland and the UK and their impact on the general working conditions and their own work efficacy and wellbeing.

This study started out as an expansion from Hale's (2005) and Jones's (2005) ground-breaking descriptive work on the role of the H&S Practitioners. However, more can be done to achieve greater knowledge about the job of the HSPs and to work towards a role definition of these professionals as previous authors have suggested (Hale, 1995a; Brun and Loisel, 2002; Hale *et al.*, 2005; Jones, 2005; Johnstone *et al.*, 2011; Cameron *et al.*, 2013). Brun and Loisel (2002) suggested that the HSPs activity could be "classified" into three main dimensions (organizational; human; technical) and at two levels (strategic and operational). Hence, through further validation and wider application of this system, a classification into the main HSPs job profiles may be explored. For further understanding on the HSPs role, the replication of the current research and this suggested study across other countries would also be highly valuable. This would contribute to the harmonisation of the role across Europe and the globe as already recommended by scholars and practitioners (INSHPO - International Network of Safety & Health Practitioner Organisations, 2015).

6.4 Implications of findings

These research findings offer new views and understanding on topics such as SC, the role of the HSP and the approach to OHS management. It is hoped that this will encourage further discussions on these aspects recognised to be significant for the current OHS situation, leading to a further and deeper understanding of this area which has been generally overlooked.

The current findings and reflections also contribute to bridging a gap in research which may inform policy and practice in this area. With this in mind, diverse paths for dissemination of this research have been envisaged. Firstly, it is hoped that the scientific publications and communications (through research and practice meetings, conferences and seminars) will also inform scholars, policy makers and practitioners, encouraging further discussions and, perhaps, resulting in suggested measures to implement and future steps to take for the continuing progress in this field.

Additionally, the dissemination of findings will involve contacting part of the participants directly, since, during the completion of the survey, respondents were given the option to provide contact details so they can be informed about research updates and relevant results arising from this study. The website created purposely for this research study (appendix 9) also offers a valuable platform for distribution of useful information and relevant findings for researchers and practitioners.

Furthermore, with the link established throughout the development of this research with professional bodies, especially IOSH, it is hoped that recommendations (practical and research related) stemming from the findings of this research may contribute to improving the current approach to the management of OHS and assist in the promotion of an unifying and integrated OHS as mentioned throughout this thesis. Further recommendations deriving from the data provided in this study may assist and/or promote the improvement of the working conditions of the HSPs. On the one hand, these could lead the discussion on the current role of HSPs and support a different

and more globally engaged position for these professionals in the OHS of the organisations. On the other hand, adequate recommendations on these professionals' job may contribute to a more positive work environment for these professionals with conditions which do not impact negatively on their health and wellbeing and which promote their optimal work efficiency. This will contribute to an improvement of these professionals' situation but, subsequently, also promote the improvement of the overall OHS and safety performance in organisations.

Lastly, since this doctoral research was developed within a research and teaching department, data and knowledge from this study can be provided, first hand, to practitioners and professionals in the area of OHS (former and current students of the online and campus-based MSc in Occupational Health) and to students in Public Health.

6.5 Conclusion

Although empirical data has, generally, shown the impact that SC has on safety performance and health of individuals, as it is commonly accepted by scholars and practitioners, more still needs to be learned to clearly understand the role of this concept on Occupational Health and Safety (OHS) and the wellbeing of the workforce. Furthermore, with the changes noticed in the current labour environment and demographics, aspects such as contract types and job insecurity should be taken into account when applying and interpreting Safety Climate (SC) in the workplace.

A compartmentalised approach to SC and, equally, to OHS still seems to be the general rule across Ireland and the UK, showing a parallel with the scenario seen in Europe. Although various efforts, resources and recommendations have been put forward by the most prominent international authorities and organisations (e.g. World Health Organisation - WHO, European Agency for Safety and Health at Work - EU-OSHA and International Labour Organization - ILO), a joint and multidisciplinary OHS approach seems far from reality. Perhaps efforts now need to focus on understanding the barriers in attaining this and discovering why these practices and standards are not being achieved.

HSPs have come a long way from the original or traditional inspection, correction or even punitive role they once held, to a more pro-active and global role in the general OHS performance in the organisation. Practitioners and scholars have now acknowledged and demonstrated the importance of a more comprehensive role which engages at the different levels in the company and the diverse areas related to OHS such as the management of both physical and psychosocial work environments as well as the promotion of health and wellbeing in the workplace (in line with the above mentioned WHO, EU-OSHA and ILO recommendations).

Nevertheless, the reverse side of this coin is also important to consider. The expansion of the HSPs' role and the increase in the responsibilities associated with it, together with the new characteristics and modern issues in workplaces, represent the current challenges affecting these professionals. These are challenges which ultimately will also impact on the OHS of the organisation and the health and wellbeing of individuals. Further attention may need to be

dedicated to understanding these practitioners' work characteristics and difficulties in an attempt to provide them with the skills they require and empower them to adequately handle these challenges, allowing them to excel in their task of ensuring the health and wellbeing of individuals at work.

This research noticed that in Ireland and the UK, there still seems to be a more traditional approach to this role, with greater emphasis on compliance and reduced engagement in psychosocial work-related issues. The support from management and stakeholders can play an essential part in allowing the development of this role to achieve the ideal OHS in an optimal manner. A model for a unifying culture has been put forward by the WHO, EU-OSHA and ILO which is seen as the ideal approach to ensure that workplace issues and health concerns (those emerging or exacerbated at work but which are known to spill-over to the setting beyond the work environment and the community) are tackled efficiently and effectively.

However, there is still a long road to travel, as the division between "health" and "safety" and between "physical" and "psychosocial" OHS is quite evident. This might represent one of the main challenges faced by OHS, the HSPs and, consequently, public health, in the coming years.

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8. Appendices

Appendix 1

Ethical approval for current doctoral research study

Sara Leitao,
Dept of Epidemiology & Public Health

5th March 2014

**Oifig an Leas - Uachtaráin Taighde
agus Nuálaíochta**
Office of the Vice President
for Research and Innovation

4th Floor, Block E,
Food Science Building,
University College Cork,
College Road, Cork, Ireland.

T +353 (0)21 4903500
E vpresearch@ucc.ie
www.ucc.ie

Dear Sara,

Thank you for submitting your research (project entitled: "Health and Safety Practitioner's Role, Safety Climate and Health and Safety Performance) to SREC for ethical perusal. I am pleased to say that we see no ethical impediment to your research as proposed and we are happy to grant approval.

We wish you every success in your research.

Yours sincerely,



Sean Hammond
Chair of Social Research Ethics Committee

Appendix 2

Inclusion and exclusion criteria for Systematic Review (Chapter 2)

Systematic Review: Inclusion and exclusion criteria

The selection of publications was mainly based on the type of study, study setting and type of variables explored. All relevant epidemiological study designs were eligible including: Randomized and Non-randomized Control Trials, Cohort studies, Cross-sectional, Case-studies and Quasi-Experimental Studies (with and without control group). Figure 3 provides more detail in relation to the inclusion or exclusion criteria.

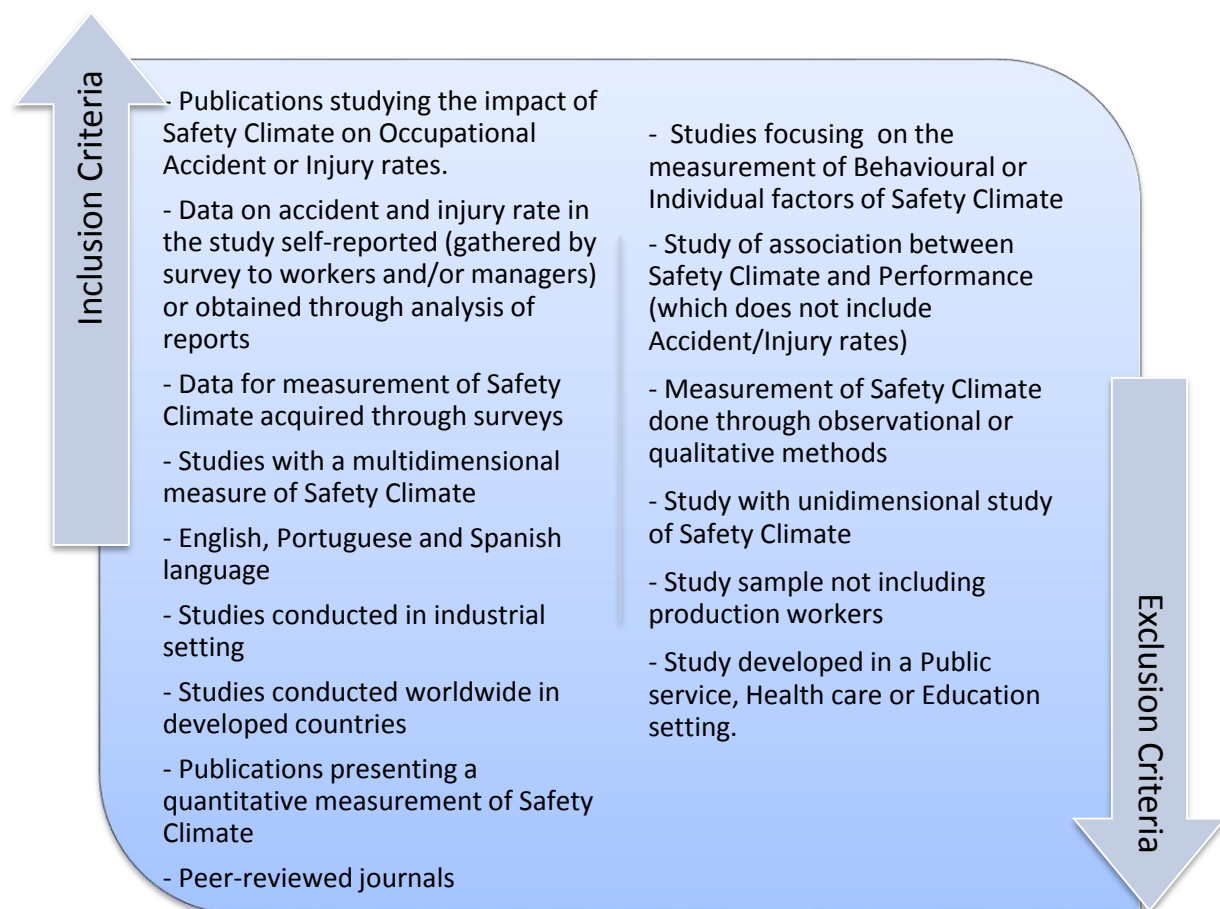


Figure XX - Inclusion and Exclusion criteria for the studies selected for the review

All studies using quantitative research methods investigating the association between organisational safety climate and occupational accidents or injuries were eligible for inclusion independent of their study design type. Papers were included only if they applied a multidimensional measure of safety climate, addressing at least one

organisational aspect of this concept such as management commitment, supervisor/management safety practices, priority for safety over production, communication, management values, safety training/education among many others.

Studies with a pure individual safety climate concept measured solely by safety compliance or health & safety behaviour were excluded. Additionally, for the purpose of this study, research was selected that did not base its assessment of SC on a measure that placed the main focus on person-related or behavioural aspects. Many studies focus its measure of Safety Climate on person-related dimensions such as safety behaviour, individual responsibility, personal involvement, risk behaviour, co-worker safety or many other directed to the employee as main responsible for this concept's level in the workplace. Nevertheless, it has been widely recognized that Organizational and Management dimensions are two highly relevant elements in the measurement of SC (Flin et al., 2000, Griffin and Neal, 2000). With this in mind, special attention was dedicated to the selection of studies for this review to ensure that these did not centred their measurement of safety Climate in Individual dimensions but rather in scales focused on organizational aspects such as Safety Training, Safety Policies, Management Commitment, among other.

Studies were eligible for inclusion when they either used self-reported injury and accident measures or company statistics on injury and accident rates. The literature search was limited to articles published in peer-reviewed journals in English, Spanish or Portuguese language without limitation by publication date. The study population was restricted to industrial settings, other sectors, for example health care or education, were excluded.

Appendix 3

Search Strategies for Systematic Review (Chapter 2)

Systematic Review - Search Strategies

EBSCO

#	Query	Limiters/Expanders	Last Run Via	Results
S1	("Safety Climate"OR "Safety Culture") and Accidents or injury	Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	202200
S2	("Safety Climate"OR "Safety Culture") and Accidents or injury	Limiters - Full Text Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	163001
S3	("Safety Climate"OR "Safety Culture") and Accidents or injury	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	137104
S4	("Safety Climate"OR "Safety Culture") and Accidents or injury not patient	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	93358
S5	("Safety Climate"OR "Safety Culture") and Accidents or injury not "patient"	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	121620
S6	("Safety Climate"OR "Safety Culture") and ("Accident*" OR "injur*")) not "patient"	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	167
S7	("Safety Climate"OR "Safety Culture") and ("Accident*" OR "injur*"))	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	182

EBSCO (continued)

#	Query	Limiters/Expanders	Last Run Via	Results
S8	("Safety Climate"OR "Safety Culture") and (("Accident*" OR "injur*")) not "patient"	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	167
S9	("Safety Climate"OR "Safety Culture") and (("Accident*" OR "injur*")) not "patient"	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Narrow by Subject2: - SECURITY measures Narrow by Subject1: - BORDER security Narrow by Subject0: - SOCIETIES, etc. Search modes - Boolean/Phrase	Interface - EBSCOhost Search Screen - Advanced Search Database - Academic Search Complete	3
S10	("Safety Climate"OR "Safety Culture") and ("Safety Outcomes") not "patient"	Limiters - Full Text; Scholarly (Peer Reviewed) Journals Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - Academic Search Complete;CINAHL Plus with Full Text;MEDLINE;PsycARTICLES;Psyc hology and Behavioral Sciences Collection;PsycINFO;SocINDEX with Full Text	59

PubMed:

((("Safety culture"[All Fields] OR "safety climate"[All Fields]) AND ("accidents"[MeSH Terms] OR "accidents"[All Fields]

458 results

((("Safety culture"[All Fields] OR "safety climate"[All Fields]) AND ("accidents"[MeSH Terms] OR "accidents"[All Fields] OR "accident"[All Fields])) NOT ("patients"[MeSH Terms] OR "patients"[All Fields] OR "patient"[All Fields])

192 Results

Science Direct:

ALL(((("Safety Culture" OR "Safety Climate") AND (accident OR injury))) AND EXCLUDE(contenttype, "5" ,"Reference Work") AND EXCLUDE(topics, "patient safety,health care") and cross-sectional AND EXCLUDE(topics, "safety behavior,medication error,management system,universal precaution,resource management,social

capital,transformational leadership") AND EXCLUDE(topics, "bus driver,completion,leadership behavior,patient handling,safety training,safety value,social safety,team training") - **196 articles found**

(ALL(("Safety Culture" OR "Safety Climate") AND (accident OR injury))) AND EXCLUDE(contenttype, "5" ,"Reference Work") AND EXCLUDE(topics, "patient safety,health care") and cross-sectional AND EXCLUDE(topics, "safety behavior,medication error,management system,universal precaution,resource management,social capital,transformational leadership") AND EXCLUDE(topics, "bus driver,completion,leadership behavior,patient handling,safety training,safety value,social safety,team training") AND EXCLUDE (journal title/book, International Journal of Nursing studies, American Journal of Infection, Critical Control Care Clinincs, Journal of the American Medical Directors Association, Journal of Hospital Infection; Journal of Emergency Nursing) - **158 articles found**

(ALL(("Safety Culture" OR "Safety Climate") AND ("safety outcomes")) and not ALL("Patient Safety" OR "Healthcare" or "Education")) and not itemstage(S5) and not itemstage(S100) and not itemstage(S200) AND LIMIT-TO(yearnav, "2015,2014"). – **25 articles found**

JStor

("Safety Climate" OR "Safety Culture") AND Accidents – 96 Results

((“Safety Climate” OR “Safety Culture”) AND Accidents) NOT “Patient” – 71 Results

((“Safety Climate” OR “Safety Culture”) AND injur*) NOT “patient” – **24 Results**

((“Safety Climate” OR “Safety Culture”) AND injur*) NOT “patient” – 0 results

Google Scholar

((“Safety Climate” OR “Safety Culture”) AND Accidents) – 13400 results

((“Safety Climate” OR “Safety Culture”) AND Accidents) NOT “Patient” – 9500 results

((“Safety Climate” OR “Safety Culture”) AND Accidents) NOT “Patient” – Search only in “Medicine, Pharmacology, and Veterinary Science” ;”Biology, Life Sciences, and Environmental Science”; “ Social Sciences, Arts, and Humanities”. – 732 results

((“Safety Climate” OR “Safety Culture”) AND Accidents) NOT “Patient”) AND cross-sectional – Search only in “Medicine, Pharmacology, and Veterinary Science” ;”Biology, Life Sciences, and Environmental Science”; “ Social Sciences, Arts, and Humanities” – 132 results

"Safety Climate" OR "Safety Culture" AND "safety outcome" -"patient safety" – 201 results

"safety climate" OR "safety culture" AND "safety outcome" -"patient safety" – healthcare – 59 results

Appendix 4

Selection of Publications for Systematic Review (Chapter 2) – Flow Diagram

Selection of Publications for Systematic Review

The relevant papers were also hand searched in order to track back any further relevant references. Paper and online versions were eligible for inclusion.

From the emerged articles, titles and abstracts were scanned for primary selection. Duplicates were removed and only then a further and more detailed analysis was done to determine whether the study satisfied the stated inclusion criteria for the review.

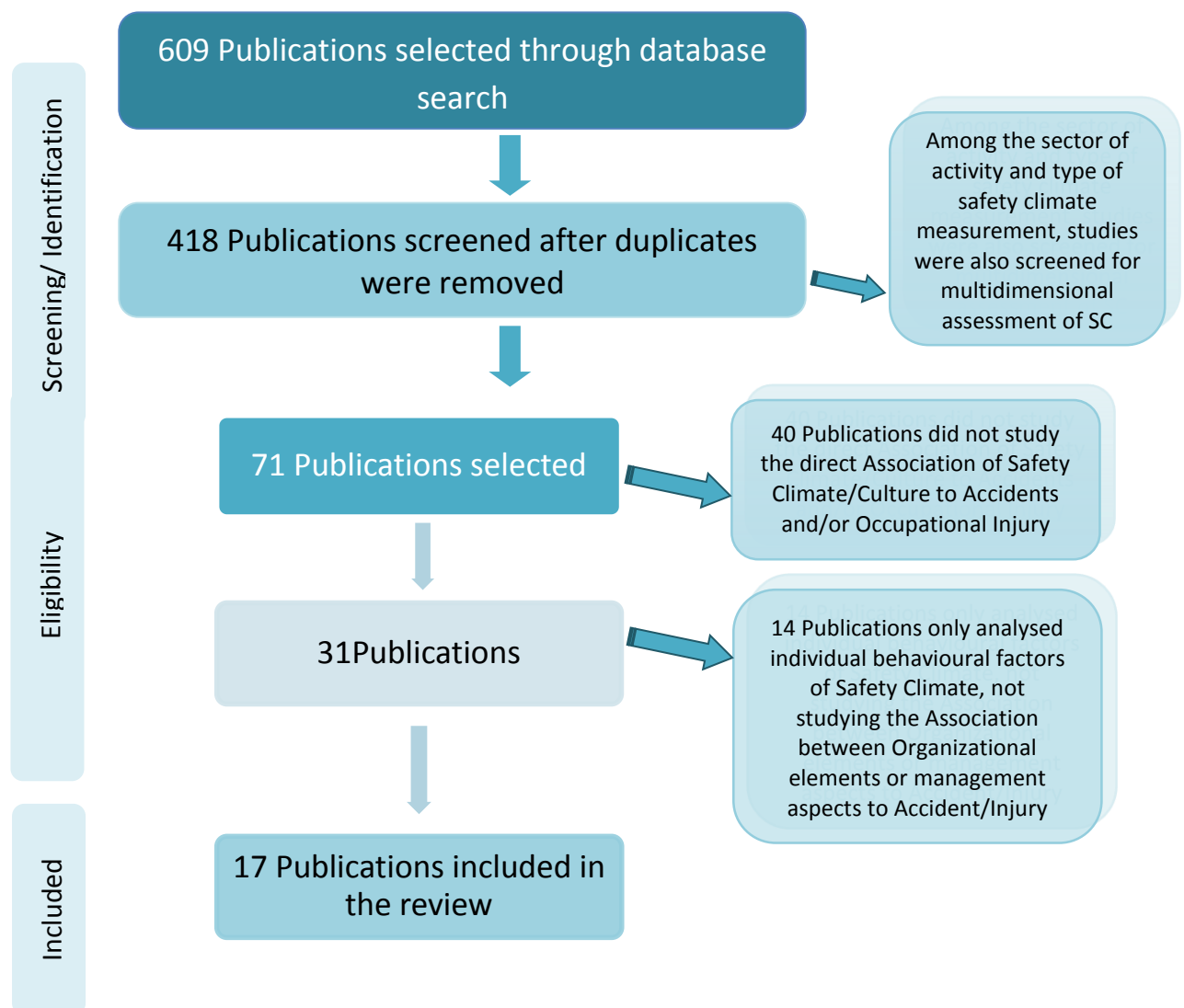


Figure - Flow Diagram of paper selection process

Appendix 5

Quality Appraisal of publications included in Systematic Review (Chapter 2)

Table 5 - Quality Appraisal applied in the publications with analysis at **individual level**.

Study	Clarke, 2006	Gillen et al., 2002	Huang et al, 2006	Lu and Tsai, 2008	Probst, 2004	Siu et al, 2004	Zacharatos et al.,2005
Main variables were properly defined conceptually (theoretical) and operationally (scale of measurement, system of classification, decision criteria, etc) (Berra, S. et al)	Yes (although decision/classification of Safety Climate is not clarified)	Yes	Yes	Yes	Yes	Yes	Yes (although decision/classification of Safety Climate is not clarified)
Were rigorous processes used to develop the questions?(e.g. piloted/validated) (new tool)	Yes	Yes	Partially (not piloted but adjusted from existing tool)	Yes	Partially: validation to the sample not mentioned nor piloting	Partially: not piloted, translation not tested.	Validation was carried out but not piloting
Measurement tools of main variables have proper validity& reliability (mention studies that analyzed them) (Berra, S. Et al)	Yes, by Mearns et al, 2001	Partially, original tool by Brown &Holmes, 1986 and Dedobbeleer &Beland,1991	Reliability & validity studied by current authors	Yes by Hayes et al, 1998; Glendon and Litherland, 2001; Mearns et al, 2003	Yes, by Neal et al, 2000 (although reliability not mentioned)	Yes, by Donald and Canter, 1993 and by others not cited	Yes, by Neal et al (2000) and validated by the current authors

Table 5 (Cont.) - Quality Appraisal applied in the publications with analysis at **individual level**.

Study	Clarke, 2006	Gillen et al., 2002	Huang et al, 2006	Lu and Tsai, 2008	Probst, 2004	Siu et al, 2004	Zacharatos et al.,2005
Was the sample representative of its target population? <i>(new tool)</i>	Partially (study focused on 1 company only)	Yes	Yes	Yes	Partially (study focused on 1 company only)	Unable to determine	Partially (limited number of companies & females removed)
Did the study achieve a good response rate? <i>(new tool)</i>	Yes (73%)	Yes (60%)	Not clear (ranged between 23% and 68%)	No (48.9%)	Not referred	Not referred	Not referred
Was data collection carried out through more than one process?	No	No	No	No	No	No	No
Statistical tests used to assess the main outcomes appropriate? (Demonstrating the direction and influence of SC on Accident/Injury rates?) <i>(Downs, Black)</i>	No	Yes	Yes	Yes, although direction not showed.	Yes	Yes	Yes

Table 5 (Cont.) - Quality Appraisal applied in the publications with analysis at **individual level**.

Study	Clarke, 2006	Gillen et al., 2002	Huang et al, 2006	Lu and Tsai, 2008	Probst, 2004	Siu et al, 2004	Zacharatos et al.,2005
Is adjustment for confounding in the analyses from which the main findings were drawn? (Downs, Black)	No	Yes, adjusted for age, height of fall and surface	No	No	Yes, adjusted for shift and workgroup/ department	No	Yes, adjusted for High- Performance work system, trust in management, personal- safety orientation
Are the results relevant locally?	Somewhat	Yes	Yes	Somewhat	No	Somewhat	Somewhat
Overall Appraisal of the Study	Theoretically Strong ; Methodological ly: Moderate strength high risk of bias and confounding	Good Theoretical Strength; Methodological ly: low risk of bias or confounding	Moderate Power at Theoretical level; Methodological ly: moderate risk of selection bias and high risk of measurement bias and confounding	Theoretically Strong ; Methodological ly: Low strength with high risk of bias and confounding	Moderate Power at Theoretical level; Methodologic ally: Moderate strength low risk of confounding, high risk of bias	Moderate Theoretically level; Methodologic ally: Low strength with high risk of bias and confounding	Moderate Power at Theoretical; Methodologic ally: Moderate/Low strength high risk of bias

Table 6 - Quality Appraisal applied in the publications with analysis at **group level**.

Study	Fullarton and Stokes, 2007	Johnson, 2007	Nielsen et al, 2008	Smith et al, 2006	Varonen and Mattila, 2000	Wallace et al. 2006	Hofmann and Stetzer, 1996
The main variables were properly defined conceptually (theoretical) and operationally (scale of measurement, system of classification, decision criteria, etc)(Berra, S. Et al)	Yes	Yes	Yes	Yes	Somewhat	Yes (although decision/classification of Safety Climate is not clarified)	Yes
Were rigorous processes used to develop the questions?(e.g. piloted/validated) (new tool)	Validity not clarified and pilot no carried out	Validation was carried out but not piloting	Partially (not piloted)	Partially (not piloted)	Validation was carried out but not piloting	Validation was carried out but not piloting	Validated but not piloted
The measurement tools of the main variables have proper validity and reliability (mention studies that analyzed them) (Berra, S. Et al)	No, validation carried out in the study and not supported	Yes, validated by Zohar and Luria (2005)	Yes, by Avolio et al 1999; Mearns et al 2003 and Kristensen et al, 2005	Yes, by Ho (2004) and Huang et al (2003, 2004, 2006)	Yes, validated by Seppala (1992) and adapted version validated by current authors	Yes, by Zohar 2000	Yes, Zohar (1980); Dedobbeleer and Beland (1991)

Table 6 (cont.) - Quality Appraisal applied in the publications with analysis at **group level**.

Study	Fullarton and Stokes, 2007	Johnson, 2007	Nielsen et al, 2008	Smith et al, 2006	Varonen and Mattila, 2000	Wallace et al. 2006	Hofmann and Stetzer, 1996
Was the sample representative of its target population? (<i>new tool</i>)	Unable to determine	Yes	Yes	Yes	Partially (focus limited to 8 wood industry)	Yes	Partially (study in one company only but on 21 groups)
Did the study achieve a good response rate? (<i>new tool</i>)	Not referred	Yes (83.43%)	Yes, Plant A: T0 – 87.8% T1 – 78% Plant B: T0 – 93.8% T1 – 86%	Yes, moderate (median 56% across companies)	Yes (Mean in 1990=59%, in 1993=70%)	Yes (96%)	Not mentioned (and total number of invited participants not clear)
Was data collection carried out through more than one process? (<i>new tool</i>)	Not able to determine method of data collection for dependent variable.	Yes, data collected through survey and reports.	No	Yes, data collected through survey and reports.	Yes, data collected through Survey and reports.	Not clear (not able to determine how survey was carried out)	No (and it is unclear how survey was carried out)
Statistical tests used to assess main outcomes appropriate? (Measuring prediction & impact of SC on Accident/Injury rates)(<i>Downs, Black</i>)	Yes	No	Yes, although just descriptive analysis.	Yes, although just descriptive analysis.	Yes, although just descriptive analysis.	Yes	Yes, although just descriptive analysis.

Table 6 (cont.) - Quality Appraisal applied in the publications with analysis at **group level**.

Study	Fullarton and Stokes, 2007	Johnson, 2007	Nielsen et al, 2008	Smith et al, 2006	Varonen and Mattila, 2000	Wallace et al. 2006	Hofmann and Stetzer, 1996
Was there adequate adjustment for confounding in the analyses from which the main findings were drawn? (include what they adjusted for) (<i>Downs, Black</i>)	No	No	No	Yes, adjusted for inherent hazards of the job	No	Yes, adjusted for tenure and group size	No
Are the results relevant locally? (<i>Cardiff tool</i>)	Not clear	Somewhat	Yes	Yes	Somewhat	Yes	Somewhat
Overall Appraisal of the Study	Low theoretical strength; Methodologi- cally: low strength with High risk of Bias and Confounding	Moderate Theoretical Strength; Methodologi- cally: High risk of confounding and low risk of bias	Moderate/High Theoretical Strength; Methodologi- cally: Moderate risk of Confounding	Moderate Theoretical Strength; Methodologi- cally: Moderate strength with high risk of Selection Bias	Low Theoretical strength; Methodologic- ally: Moderate strength with risk of Selection Bias and Confounding	Moderate Theoretical Strength; Methodologi- cally: High Strength with low risk of bias or confounding	Moderate Theoretical Strength; Methodologi- cally: Moderate strength with High risk of confounding and low risk of selection bias

Table 7 - Quality Appraisal applied in the publications with analysis at group&individual level.

Study	Oliver et al.,2005	Mearns et al, 2003	Vinodkumar and Bhasi, 2009
Main variables were properly defined conceptually (theoretical) and operationally (scale of measurement, system of classification, decision criteria, etc) (Berra, S. et al)	Yes	Somewhat	Yes
Were rigorous processes used to develop the questions?(e.g. piloted/validated) (new tool)	Validation was carried out but not piloting	Validation was carried out but not piloting	Yes
Measurement tools of main variables have proper validity& reliability (mention studies that analyzed them) (Berra, S. Et al)	Yes, by Díaz (2005) and Cheyne, Oliver and Tomás (2005)	Yes, although adjusted tool developed/applied in this study has not been analysed before	Yes, by Flin et al. (2000) and authors
Was the sample representative of its target population? (new tool)	Yes	Yes	Yes
Did the study achieve a good response rate? (new tool)	Not referred	No (mean on year1=27%; year2= 38%)	Yes (71%)
Was data collection carried out through more than one process? (new tool)	No	No	No
Statistical tests used to assess main outcomes appropriate? (Demonstrating direction & influence of SC on Accident/Injury rates) (Downs, Black)	Yes	No	No

Table (cont.) - Quality Appraisal applied in the publications with analysis at **group&individual level**.

Study	Oliver et al.,2005	Mearns et al, 2003	Vinodkumar and Bhasi, 2009
Was there adequate adjustment for confounding in the analyses from which the main findings were drawn? (include what they adjusted for) (<i>Downs, Black</i>)	Yes, adjusted for work environment and risks	No	No
Are the results relevant locally?(<i>new tool</i>)	Yes	Not clear	Yes
Overall Appraisal of the Study	Moderate Theoretical Strength; Methodologically: Moderate/High strength but with risk of measurement bias	Low theoretical strength; Methodologically: Low strength (High risk of Bias and Confounding)	Theoretically Strong ; Methodologically: Moderate strength, high risk of confounding &measurement bias

Appendix 6

Questionnaire used for Contingent Work study (Paper 2 - Chapter 3)

Safety Climate in the Workplace

Dear Colleague

We would like to find out how you feel about your company's Health and Safety practices and principles. In order to do this we would like you to complete this questionnaire.

It is important for you to be completely honest about your feelings and opinions. All responses will be treated in strict confidence and your identity will be thoroughly protected. Your name will not be associated with any of the final information gathered from this questionnaire. The responses will be processed in confidence by Sara Leitao (from UCC) who is developing this project especially for Jansen's benefit.

If you have any questions or would like further information on this, feel free to contact Sara through sleitao1@its.jnj.com.

Thank you in advance for participating and for your co-operation.



Safety Climate in the Workplace

Demographic Information

The next questions refer to general information about you.

Please complete with the requested information.

1. What is your gender?

- ☐ Female
- ☐ Male

2. What is your age?

3. What is the job title for your current position?

4. How many years have you worked with the present company? (Please write the number of years)

Safety Climate in the Workplace

Occupational Health and Safety

The questions below refer to your experiences as a worker in this company. Please select the answer that describes your situation.

5. Did you ever experience an accident and/or incident while working in this company?

- ☐ Yes
- ☐ No

6. Did you ever have to take time off (sick leave) due to a work accident and/or injury?

- ☐ Yes
- ☐ No

7. When did you last have Health and Safety related training? (Please select the option that applies to your situation)

- ☐ more than 2 years ago
- ☐ more than 1 year ago
- ☐ more than 6 months ago
- ☐ more than 1 month ago
- ☐ 1 month ago (or less)
- ☐ 1 week ago (or less)

Safety Climate in the Workplace

**8. The statements that follow relate to the Safety Climate in your organisation.
Please mark the option that indicates your level of agreement with them.**

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
It is important to me that there is a continuing emphasis on safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Co-workers often give tips to each other on how to work safely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety rules and procedures are carefully followed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am sure it is only a matter of time before I am involved in an accident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management operates an open door policy on safety issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I am not given enough time to get the job done safely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management acts decisively when a safety concern is raised	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is good communication in this company about safety issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand the safety rules for my job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety is the number one priority in my mind when completing a job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am involved in informing management of important safety issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management clearly considers the safety of employees of great importance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Safety Climate in the Workplace

9. (Cont.) The statements that follow relate to the Safety Climate in your organisation. Please select the option that indicates the level of agreement with each of them.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly
I am rarely worried about being injured on the job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personally I feel that safety issues are not the most important aspect of my job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am strongly encouraged to report unsafe conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not receive praise for working safely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees are not encouraged to raise safety concerns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my workplace the chances of being involved in an accident are quite large	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some health and safety rules and procedures are not really practical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am involved with safety issues at work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my workplace, management turn a blind eye to safety issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some safety rules and procedures do not need to be followed to get the job done safely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operational targets often conflict with safety measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This is a safer place to work than other companies I have worked for	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that safety issues are not assigned a high priority	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Corrective action is always taken when management is told about unsafe practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management acts only after accidents have occurred	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. (Cont.) The statements that follow relate to the Safety Climate in your organisation. Please select the answer that indicates your level of agreement with them.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I am never involved in the ongoing review of safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety information is always brought to my attention by my line manager/supervisor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes it is necessary to depart from safety requirements for production's sake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes conditions here hinder my ability to work safely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am clear about what my responsibilities are for health and safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When people ignore safety procedures here, I feel it is none of my business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my workplace management acts quickly to correct safety problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are always enough people available to get the job done safely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My line manager/supervisor does not always inform me of current concerns and issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can influence health and safety performance here	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A safe place to work has a lot of personal meaning to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Safety Climate in the Workplace

11. (Cont.) The statements that follow relate to the Safety Climate in your organisation. Please select the option that indicates the level of agreement with each of them.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Managers and supervisors express concern if safety procedures are not adhered to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Workplace health and safety training covers the types of situations that employees encounter in their job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management considers safety to be equally as important as production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees receive comprehensive training in workplace health and safety issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A no-blame approach is used to persuade people acting unsafely that their behaviour is inappropriate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I cannot always get the equipment I need to do the job safely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my workplace managers/supervisors show interest in my safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees have sufficient access to workplace health and safety training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety issues are given high priority in training programs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please take a minute to think about Health and Safety in the company and your workplace.

If there was one thing that could be changed in the Health and Safety of your job or the company, what would that be? (Please complete with your thoughts or opinion on this)

13. As part of the initiatives being developed, a discussion group session will be taking place in the next few weeks.

This session will be mediated by Sara (from UCC) and will be an opportunity to share your ideas and opinions on different aspects related to Health and Safety.

Can we contact you to invite you for one of these group discussions?

14. Do you have any further comments related to Health and Safety in your workplace?

Appendix 7

Invitation letter for recruitment of Health and Safety Practitioners (Paper 3 & 4 – Chapter 4 & 5)

Dear colleague,

Is your role as a Health and Safety Practitioner clearly defined in your organisation?
What do you value in your job? Is there anything you would change?

We believe these questions should be answered and your contribution as an H&S Practitioner is essential to do this. Hence, we would like to invite you to take part in our study by completing a questionnaire which should take approximately 20 minutes.

This survey is part of the international study "*H&S Practitioner's Role, Safety Climate and H&S Performance*" taking place in University College Cork (UCC) with the collaboration of the Institution of Occupational Safety and Health (IOSH). This research project has received ethical approval from the UCC Social research Ethics Committee.

Once you complete this questionnaire you can be **included in a draw* to win an android tablet and €50 or €20 Amazon vouchers.**

All aspects of this survey are **completely confidential** and your anonymity as a respondent to the questionnaire will be preserved. There are no risks associated to your participation in this survey and you are free to withdraw and discontinue participation at any time.

To complete the survey please click on the following link:

<https://www.surveymonkey.com/s/HS-RoleAndClimate>

By completing the questionnaire you will be agreeing to participate in this study carried out by Dr. Birgit Greiner (Principal investigator) and Ms. Sara Leitão (Lead Investigator) from UCC, Ireland in collaboration with (IOSH).

If you would like to find out about the findings of this research, once it is complete, a summary report will be available online to all the participants or via email (if requested).

If you have any questions or concerns participating in this study, please do not hesitate to contact me at +353-(0)214205521 or by email at s.leitao@ucc.ie. Additionally you may log onto our webpage <http://www.ucc.ie/en/epid/postgrad/masters-occupation-health/occupationalhealthresearch/healthandsafetyroleandclimate-researchstudy/>.

Thank you for your invaluable participation!

Sara Leitão (BSc, MSc, Lead Investigator)

Letter of Invitation to participate in the study:

* To take part in the draw you will be asked to provide an email address so we can contact you should you be the winner. Any information which you provide will not be shared and will only be used for the purposes of this study. Only the researcher (Ms. Sara Leitão) will have access to the contact details you provide and any identifying details will be removed to protect your privacy before any results are reported. If you would like to access your information or if you would like your information to be deleted at any time you can contact the research team at the contact details provided.

Appendix 8

Questionnaire used for “Health and Safety Practitioners study” (Chapter 4 & 5)

Health & Safety Practitioner's Role and Health & Safety

Dear Health and Safety Practitioner,

Dear colleague,

This survey is part of the study “H&S Practitioner’s Role, Safety Climate and H&S Performance” which is taking place in University College Cork (UCC) with the collaboration of the Institution of Occupational Safety and Health (IOSH) and ethical approval from the UCC Social Research Ethics Committee.

Is your role as a Health and Safety Practitioner clearly defined in your organisation? What do you value in your job? Is there anything you would change?

We believe these questions should be answered and your contribution as a H&S Practitioner is essential to do this. Hence, we would like to invite you to take part in our study by completing a questionnaire which should take approximately 20 minutes.

With this study we wish to learn more about your role as a Health and Safety Practitioner and the characteristics of your work within your company. Your cooperation in this study is entirely voluntary and would be deeply appreciated. It will contribute to a clearer understanding of the different roles H&S practitioners currently have, their expanding responsibilities in a continuously changing work environment.

These findings will inform training and continuous professional education needs for this front-line profession. It is intended that these results generate and drive the discussion with the relevant bodies on the H&S role, contributing to a refocus necessary to the optimization of the Health and Safety job in a society with everlasting changes and a fast pacing alterations.

Once you complete this questionnaire you can be included in a draw to win an Android Tablet and €50 or €20 Amazon vouchers.

All aspects of this survey are completely confidential and your anonymity as a respondent to the questionnaire will be preserved. There are no risks associated to your participation in this survey and you are free to withdraw and discontinue participation at any time. The information collected in the questionnaire will only be published in summary statistics and your personal responses will not be shared with anybody outside the research team.

By completing the questionnaire you will be agreeing to participate in this study carried out by Dr. Birgit Greiner (Principal Investigator) and Ms. Sara Leitão (Lead Investigator) from University College Cork, Ireland in collaboration with the Institution of Occupational Safety and Health (IOSH).

If you would like to find out about the findings of this research, once it is complete, a summary report will be available online to all the participants or via email (if requested).

If you have any questions or concerns participating in this study, please do not hesitate to contact me at +353-(0)214205521 or by email at s.leitao@ucc.ie. Additionally you may log onto our webpage <http://www.ucc.ie/en/epid/postgrad/masters-occupation-health/occupationalhealthresearch/healthandsafetyroleandclimate-researchstudy/>.

Thank you for your invaluable participation!

Sara Leitão (BSc, MSc, Lead Investigator)

Health & Safety Practitioner's Role and Health & Safety

1. Please confirm you have understood the information above.

- ☐ I understand the information above and agree to participate in the research study.
- ☐ I would prefer not to take part in this survey



Personal Information

The next questions refer to general demographic information.
Please select the right answer and complete with the requested information.

2. What is your gender?

- ☐ Female
- ☐ Male

3. What is your age?

4. Which (health and) safety qualifications have you obtained? (Select more than one, if appropriate)

- ☐ None
- ☐ Masters or higher in Occ. Safety & Health (OSH) or similar discipline
- ☐ Post-graduate qualification in OSH or similar discipline (ex. PG Certificate or PG Diploma)
- ☐ BSc in OSH or similar discipline
- ☐ Higher education diploma or equivalent in OHS (or similar discipline)
- ☐ Other (please specify)

5. What country do you currently work in?

- ☐ United kingdom
- ☐ Ireland
- ☐ United States
- ☐ Canada
- ☐ Other (please specify)

6. How many years have you been working as a health and safety professional? (Please report the number of years)

7. How many years have you worked as a health and safety professional with your present organisation? (Please report the number of years)

Health & Safety Practitioner's Role and Health & Safety

**8. What was your professional role before becoming a Health and Safety practitioner?
(Please select the area of work that best applies to your situation)**

- ☐ Other
- ☐ Human Resources
- ☐ Quality Assurance
- ☐ Professional trade (i.e. electrician; plumbing; welding, etc.)
- ☐ Engineering
- ☐ Always worked as a Health and Safety Practitioner

Other (please specify)

9. Is your Health and Safety role... (please select the option that applies to you)

- ☐ ...an internal position within the organisation.
- ☐ ...an external position, hired as consultancy for one or more organisations.
- ☐ Other (please specify)

The Health and Safety Practitioner in the company

The following questions relate to the your company and its characteristics. Please complete with the information requested.

10. Which description best classifies the main activity of your organisation or company?

Please select the option that best applies.

- | | |
|--|---|
| <input type="radio"/> Agriculture, forestry or fishing | <input type="radio"/> Wholesale and retail trade |
| <input type="radio"/> Manufacturing | <input type="radio"/> Public Administration and Defence |
| <input type="radio"/> Accommodation and food service | <input type="radio"/> Administrative and support service |
| <input type="radio"/> Transportation and storage | <input type="radio"/> Arts, entertainment and recreation |
| <input type="radio"/> Health and social work | <input type="radio"/> Construction |
| <input type="radio"/> Electricity, gas and air-conditioning supply | <input type="radio"/> Mining, quarrying (including natural gas or petroleum extraction) |
| <input type="radio"/> Education | |
| <input type="radio"/> Other (please specify) | |

11. What is the job title for your current position as a Health and Safety Practitioner?

- ☐ Health and Safety Officer
- ☐ Health and Safety Manager
- ☐ Health and Safety Specialist/Practitioner
- ☐ Other (please specify)

12. In what area do you work? (Please select all that apply)

- ☐ Occupational health & safety service
- ☐ Environment
- ☐ Training
- ☐ Emergency services
- ☐ Industrial Hygiene
- ☐ Other (please specify)

13. Think about the work you had originally when you started in the current position. In the past 3 years, have there been any changes in the tasks you perform? (Please select the option that applies to you)

- ☐ I had a different job 3 years ago
- ☐ There have been no changes in the tasks I perform.
- ☐ There has been very little change in my tasks (about 40% or less).
- ☐ There has been very some change in my tasks (about 60%).
- ☐ There has been a lot of change in my tasks (about 80% or more).

14. What is the total number of people covered by your safety (advisory) responsibilities in your company (including contractors and sub-contractors)?

- ☐ Under 100 people
- ☐ 101-250 people
- ☐ 251-500 people
- ☐ 501-1000 people
- ☐ 1001-5000 people
- ☐ Over 5000 people

Health & Safety Practitioner's Role and Health & Safety

15. Are other health and safety professionals employed in your organisation and if so, how many?

- ☐ No others
- ☐ 1 other H&S Practitioner
- ☐ 2 to 4 other H&S Practitioners
- ☐ 5 to 10 other H&S Practitioners
- ☐ More than 10 other H&S Practitioners

16. Does your work as Health and Safety Practitioner relate to more than one site/company?

- ☐ Yes
- ☐ No

17. If yes, how many?

- ☐ 2 sites
- ☐ 3 sites
- ☐ 4 sites
- ☐ 5 sites
- ☐ more than 5

18. Are these sites in more than one country?

- ☐ No
- ☐ Yes, if so, which countries?

19. Is your position as Health and Safety Practitioner a part-time or full-time position?

- ☐ Full-time
- ☐ Part-time (if so, how many hours A WEEK do you perform this role)

20. If your role as a Health and Safety Practitioner is part-time, what other responsibilities/roles do you have outside of your Health and Safety position?

21. Are there other health, safety or environment specialists directly employed in your organisation? (Please select all that apply)

- ☐ Occupational physician
- ☐ Occupational hygienist
- ☐ Occupational health nurse
- ☐ Work and organisation specialist
- ☐ Ergonomist
- ☐ Environmental specialist
- ☐ Fire specialist
- ☐ Health physicist/radiation expert
- ☐ None of the above
- ☐ Other (please specify)

The Health and Safety Practitioner's role

This section contains a list of tasks which you, in your safety professional role, may carry out. We would like to know which ones you do carry out and how frequently.

For each task select the option that reflects best how frequently you personally carry out the task on average in your job.

22. How often do you...

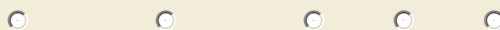
	Weekly or more	Monthly/Quarterly	Yearly or less	Never yet, but it is part of my job	Not part of my job
Investigate & evaluate workplace or plant risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Perform job safety analyses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Review a design, based on safety criteria, as someone external to the design team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carry out risk analysis of projects, designs or activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop or improve procedures for the safe use and maintenance of machines, processes or workplaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Give instruction on the safe use and maintenance of machines, processes or workplaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check compliance with safety procedures for machines, processes, dangerous materials or workplaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Specify safety measures for dangerous materials, processes or equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design or improve procedures for the use and maintenance of Personal Protective Equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Health & Safety Practitioner's Role and Health & Safety

Develop the company safety management system



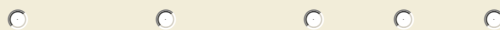
Design performance indicators for the safety management system



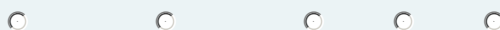
Propose improvements to the safety management system (or parts of it)



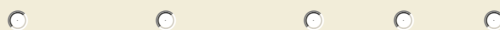
Implement improvements recommended following from investigations



Design health promotion or safety training programmes, courses or workshops



Check performance of the overall safety management system



Health & Safety Practitioner's Role and Health & Safety

23. How often do you.... (cont.)

	Weekly or more	Monthly/Quarterly	Yearly or less	Never yet, but it is part of my job	Not part of my job
Prepare company policy on safety culture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assess the safety culture of plant or company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lead or advise on organisational change to achieve improvement in safety performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check whether company policy or procedures conforms to legal rules and regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participate in the selection of staff or placement of workers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design a safety campaign	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement a safety campaign	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design a health promotion campaign	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement a health promotion campaign	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inform/discuss with safety representatives/ committee about possible risks and safety measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inform/discuss with employees about possible risks and safety measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement actions/interventions to ensure application/compliance with company's annual safety plan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inform/discuss with first line supervisors about possible risks and safety measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Health & Safety Practitioner's Role and Health & Safety

Inform/discuss with top
managers about possible
risks and safety measures



24. How often do you... (Cont.)

	Weekly or more	Monthly/Quarterly	Yearly or less	Never yet, but it is part of my job	Not part of my job
Develop a programme of psychosocial risk assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop a programme of psychosocial prevention measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Publish information about Health and/or Safety in a company newsletter or other internal communication medium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Give health promotion training programmes, courses or workshops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Give safety training programmes, courses or workshops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investigate accidents or incidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keep statistics about accidents and incidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make recommendations for improvement arising out of investigations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct workplace inspections of physical prevention measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement a programme of Psychosocial prevention measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct workplace audits of safe behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prepare company policy on emergency procedures intervention and first aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Health & Safety Practitioner's Role and Health & Safety

Prepare (parts of) an annual
plan for safety

Prepare (parts of) an annual
report on safety

Health and Safety in the Organisation

The statements that follow relate to a variety of factors regarding Health and Safety in your organisation.

25. Top Management in this plant/company ...

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Reacts quickly to solve the problem when told about safety hazards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insists on thorough and regular safety audits and inspections.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tries to continually improve safety levels in each department.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provides all the equipment needed to do the job safely.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is strict about working safely when work falls behind schedule.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quickly corrects any safety hazard (even if it's costly).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provides detailed safety reports to workers (e.g., injuries, near accidents).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Health & Safety Practitioner's Role and Health & Safety

26. Top Management in this plant/company ... (Cont.)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Considers a person's safety behavior when moving/promoting people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Requires each manager to help improve safety in his/her department.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Invests a lot of time and money in safety training for workers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uses any available information to improve existing safety rules.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listens carefully to workers' ideas about improving safety.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Considers safety when setting production speed and schedules.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provides workers with a lot of information on safety issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regularly holds safety-awareness events (e.g., presentations, ceremonies).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gives safety personnel the power they need to do their job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Health & Safety Practitioner's Role and Health & Safety

27. Please read each statement carefully and select the option that indicates how much you agree or disagree with this.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

Around here they look at how well you take care of your health when they consider you for promotion.

☐ ☐ ☐ ☐ ☐

The supervisors encourage workers to make changes to improve their health.

☐ ☐ ☐ ☐ ☐

At the workplace, sometimes individuals talk with each other about improving their health and preventing disease.

☐ ☐ ☐ ☐ ☐

Supervisors always enforce health-related rules (smoking policies, requirements about medical examinations, etc.).

☐ ☐ ☐ ☐ ☐

Most employees here are very health conscious.

☐ ☐ ☐ ☐ ☐

Characteristics of Work

28. The following questions refer to working characteristics of your job as Health and Safety professional.

Please select the answer that most applies to your job situation.

	To a Very Large extent	To a Large extent	Somewhat	To a Small extent	To a Very Small extent
Do you know exactly which areas are your responsibility?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Does your work have clear objectives?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you know exactly what is expected of you at work?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you know exactly how much say you have at work?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Health & Safety Practitioner's Role and Health & Safety

29. The statements below refer to diverse aspects of your job as Health and Safety Professional. Please select the answer that most applies to your job situation.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The job allows me to make decisions about what methods I use to complete my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job allows me to decide on the order in which things are done on the job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job provides me with significant autonomy in making decisions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job allows me to make a lot of decisions on my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job gives me considerable opportunity for independence and freedom in how I do the work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job allows me to make my own decisions about how to schedule my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job gives me a chance to use my personal initiative or judgment in carrying out the work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job allows me to decide on my own how to go about doing my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The job allows me to plan how I do my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Job Characteristics

30. Below you can find statements related to your work.

Please select the option that best represents your opinion.

Strongly Disagree Disagree Somewhat Not Sure Agree Somewhat Agree Strongly Agree

I am confident about my ability to do my job.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I am self assured about my capabilities to perform my work activities.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I have mastered the skills necessary for my job.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

My impact on what happens in my department is large.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I have a great deal of control over what happens in my department.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I have significant influence over what happens in my department.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Health & Safety Practitioner's Role and Health & Safety

31. The following statements describe different characteristics of work. For each of them please select the option that best represents your own situation.

	Strongly Disagree	Disagree	Agree	Strongly Agree
My job requires that I learn new things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My job involves a lot of repetitive work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My job requires me to be creative.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My job allows me to make a lot of decisions on my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My job requires a high level of skill.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On my job, I am given a lot of freedom to decide how I do my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get to do a variety of things on my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a lot to say about what happens on my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have an opportunity to develop my own special abilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Health & Safety Practitioner's Role and Health & Safety

32. The following statements describe different characteristics of work. For each of them please select the option that best represents your own situation.

	Strongly Disagree	Disagree	Agree	Strongly Agree
My job requires working very fast.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My job requires working very hard.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not asked to do an excessive amount of work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have enough time to get the job done.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am free from conflicting demands others make.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People I work with are competent in doing their jobs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People I work with take a personal interest in me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People I work with are friendly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People I work with are helpful in getting the job done.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

General Health

The statements below refer to your General Health. Please select the option that you believe best describes your situation.

33. Have you recently...

	Not at all	No more than usual	Rather more than usual	Much more than usual
Lost much sleep over worry.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt constantly under strain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt you couldn't overcome your difficulties.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been feeling unhappy and depressed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been losing confidence in yourself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been thinking of yourself as a worthless person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34. Have you recently...

	Better than usual	Same as usual	Less than usual	Much less than usual
Felt that you are playing a useful part in things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt capable of making decisions about things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been feeling reasonably happy, all things considered.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been able to concentrate on whatever you are doing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been able to face up to your problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Been able to enjoy your normal day to day activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

General Health (cont.)

35. Below are some statements about feelings and thoughts.

Please tick the option that best describes your experience of each, over the last 2 WEEKS.

	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling relaxed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling interested in other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've had energy to spare	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been dealing with problems well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been thinking clearly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling good about myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling close to other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been able to make up my own mind about things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling loved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been interested in new things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been feeling cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. By completing this questionnaire you can be included in a draw to win an android tablet. To be in the chance to win this tablet please enter your email address below.

* To take part in the draw you will be asked to provide an email address so we can contact you should you be the winner. Any information which you provide will not be shared and will only be used for the purposes of this study. Only the researcher (Ms. Sara Leitão) will have access to the contact details you provide and any identifying details will be removed to protect your privacy before any results are reported. If you would like to access your information or if you would like your information to be deleted at any time you can contact the research team at the contact details provided.

37. A Summary Report with the results of this study will be developed and made available to the participants. If you would like to receive a copy of this Summary Report please include your email below. Alternatively contact us on s.leitao@ucc.ie.

Appendix 9

Webpage created for promotion and dissemination of the Health and Safety Practitioners' Research Study (Chapter 4 & 5)

[Study@UCC](#)[Research](#)[Campus Life](#)[Schools & Departments](#)[About UCC](#)[Alumni](#)

Health and Safety Role and Climate - research study

Home > Academic > Epidemiology and Public Health > Courses > Postgraduate > MSc in Occupational Health >

[Home](#)[Courses](#)[Undergraduate](#)[Postgraduate](#)[Masters in Public Health \(Online\)](#)[Masters in Public Health Programme \(MPH\)](#)[Postgraduate Certificate in Health Protection](#)[Postgraduate Certificate in Health Protection \(Online\)](#)[MSc in Occupational Health CPD Modules](#)[Student Perspectives](#)[Occupational Health Research](#)[Health and Safety Role and Climate - research study](#)[News](#)[Contact Us](#)[Online MSc Occ. Health](#)[PhD Programmes](#)[Research](#)[People](#)[News & Events](#)[Publications](#)[What is Public Health?](#)[Epidemiology & Public Health Subject Portal](#)[Office Hours](#)

Health and Safety Practitioner's Role and Climate - The research project

Our main aim...

... increase recognition of the H&S Practitioners activity across Europe and contribute to knowledge sharing across the countries, developing models of good practice.

We want to learn more about the role of Health and Safety Practitioners and the characteristics of their work within your company. We hope this study will contribute to a clearer understanding of the different roles H&S practitioners currently have, their expanding responsibilities in a continuously changing work environment.

These findings will inform training and continuous professional education needs for this front-line profession. It is intended that these results generate and drive the discussion with the relevant bodies on the H&S role, contributing to a refocus necessary to the optimization of the Health and Safety job in a society with everlasting changes and a fast pacing alterations.



In collaboration with

[Interesting Links](#)[Contact Us](#)

Our survey is now live!

If you are a Health and Safety Practitioner and would like to take part, please go to:

<https://www.surveymonkey.com/s/HIS-RoleAndClimate>

(for T&C please read first page of the questionnaire carefully. More info in our section "Taking part in the survey -what it involves")

[Our drive...](#)[+](#)[Taking part in the survey - what it involves](#)[+](#)[If you would like to take part...](#)[+](#)[The research team](#)[+](#)[Contact us](#)[+](#)

Epidemiology and Public Health , Fourth Floor, Western Gate Building, University College Cork,Cork, Ireland

Connect to UCC

+353 (0)21 420 5500 epidemiology@ucc.ie tel: +353 (0)21 420 5469



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Our drive...

It is, generally, acknowledged that work plays a pivotal role in the maintenance of, not only physical health, but also psychological well-being. However, the frontline professionals in promoting such conditions – the Health and Safety Officers – are often not recognized for their role. In fact, this is still a job without a clear role definition across Europe or even, in some countries, at national level as it is the case in Ireland.

Although the role of this professional is vaguely defined in different jurisdictions, it still lacks a specific job description that defines in detail his/her responsibilities, tasks and level of authority. Thus, to compare the different situations of Ireland, Portugal and UK, as it will be carried out in the current study, becomes interesting.

Work environment and demands have changed with the progress in technology and modernity of organizations and, as required with this shift, Occupational Health and Safety (OHS) practice has added new issues of psychosocial hazards at work. Therefore, it becomes important and pertinent to look into what challenges these professionals face and explore the possible psychosocial and organizational work factors that might influence them.



Taking part in the survey - what it involves

Participants

H&S Practitioner from diverse sectors in Ireland, Portugal and UK are being invited to take part in the study. The professionals that agree to participate will complete a questionnaire with simple questions related to diverse aspects and characteristics of their job and role as a Health and Safety Professional.

The Survey

The survey is web-based and, therefore, will be completed online. A link is sent to the participant's email that will give him/her access to the questionnaire. The questionnaire is composed by multiple choice questions and its completion will take approximately 20 minutes.

This link is uniquely tied to this survey and your email address (with careful consideration to your confidentiality). The link also allows you to return to the survey whenever needed. Thus, should a participant have to interrupt the completion of the survey, he/she will be able to return to the section where he/she stopped previously.

"I would prefer to complete the survey on a different format, not on the website"

If you would prefer to complete the questionnaire "off-line" a PDF version of the survey can be forwarded to you. For this, all you have to do is contact us (via email at s.leitao@ucc.ie) and this questionnaire will be sent to the email address provided by you.

Confidentiality and Anonymity

Confidentiality and anonymity are a priority for us and thus, all the information gathered will be carefully handled and safely kept. The information obtained will not be shared and only and strictly the research team will have access to the completed questionnaire and study records.

All aspects of this survey are completely confidential and your anonymity as a respondent to the questionnaire will be preserved. There are no risks associated to your participation in this survey and you are free to withdraw and discontinue participation at any time. The information collected in the questionnaire will only be published in summary statistics and your personal responses will not be shared with anybody outside the research team.

If you would like to take part...

If you would like to be part of our "H&S Role and Climate" project, it is very simple!

All you have to do is complete our questionnaire by clicking on:

<https://www.surveymonkey.com/s/HS-RoleAndClimate>

The survey should take approximately 20 minutes and your cooperation in this study is entirely voluntary.

Your participation matters and is deeply appreciated!

If you would prefer to complete the questionnaire "off-line" a PDF version of the survey can be forwarded to you. For this, all you have to do is contact us (via email at s.leitao@ucc.ie) and this questionnaire will be sent to the email address provided by you.

Once you complete this questionnaire you can be included in a draw to win an Android Tablet and €50 or €20 Amazon vouchers.

All aspects of this survey are completely confidential and your anonymity as a respondent to the questionnaire will be preserved. There are no risks associated to your participation in this survey and you are free to withdraw and discontinue participation at any time. The information collected in the questionnaire will only be published in summary statistics and your personal responses will not be shared with anybody outside the research team.

By completing the questionnaire you will be agreeing to participate in this study carried out by Dr. Birgit Greiner (Principal Investigator) and Ms. Sara Leitão (Lead Investigator) from University College Cork, Ireland in collaboration with the Institution of Occupational Safety and Health (IOSH).

The research team

The Research Team

Principal Investigator: [Dr. Birgit Greiner](#) (click on the link to see Dr. Greiner's research profile)

Lead Investigator: [Ms. Sara Leitão](#) (click on the link to see Sara's research profile)

Contact us

Contact us...

If you would like to find out more or comment on the "H&S Role and Climate" research project, you may contact us through any of the options below:

Email: s.leitao@ucc.ie

Tel: ☎ 00353 214205521

Fax: 00353 21 4901923

Address: Sara Leitao

University College Cork
Dpt. of Epidemiology & Public Health
4th Floor - Western Gateway Building
Western Road
Cork, Ireland



Appendix 10

Research Dissemination in Conferences

Dissemination of Research in Conferences

- **Working on Safety (WOS) 2015**, Porto, Portugal, 2015. Leitão S., Greiner B. A., "Safety Climate and Job demand-control-support: impact on Health and Safety Practitioners' wellbeing and efficacy" – *oral presentation*.
- **XX World Congress on Safety and Health at Work**, Frankfurt, Germany, 2014. Leitão S., Greiner B. A., "Safety climate and occupational accidents and Injuries: differences among permanent and contingency workers" – *Oral presentation*.
- **11th Conference of the European Academy of Occupational Health Psychology**, London, UK, 2014. Leitão S., Greiner B. A., "Safety climate and occupational accidents and injuries: differences among permanent and contingency workers" – *Oral presentation*.
- **10th Conference of the European Academy of Occupational Health Psychology**, Zurich, Switzerland, 2012. Leitão S., Greiner B. A., "The influence of safety climate on occupational accident and injury rates: Systematic review of the scientific evidence" – *Oral presentation*.
- **UCC – Doctoral Showcase 2011**, Cork, Ireland, 2011. Leitão S., Greiner B. A., "Health and Safety Officer: who looks after the professional looking after workers?" – *Poster presentation*.